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RECURRING GROWTH EXTENDING ON THE CORNEA IN VERNAL CONJUNCTIVITIS
(GONZALEZ, CASE 7, P. 239)

THE RIGHT EYE SHOWS CHARACTERISTIC MASSES ON THE EVERTED UPPER LID. THE LEFT
EYE SHOWS WHITISH VERTICAL SCAR FOLLOWING PREVIOUS EXTIRPATION
WITH THE GALVANO-CAUTERY, AND THE RECURRING GROWTH
EXTENDING FROM THE NASAL LIMBUS
IN FRONT OF THE PUPIL

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No. 4

CLINICAL NOTES ON VERNAL CATARRH OR EXUBERANT PERICORNEAL CONJUNCTIVITIS

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LEON, GTO, MEXICO.

This paper calls attention to ametropia and keratoconus consecutive to this disease; the value of the x-rays in its therapeutics, reports a case of large recurring vegetation invading the cornea and cured by the x-rays. It was presented to the Section on Ophthalmology of the Fifth National Medical Congress of Mexico, held in Puebla, January, 1918.

Although the literature about exuberant pericorneal conjunctivitis, so named by Dr. Manuel Carmona y Valle, is very extensive, there remain to be explained some points about its complications, therapeutics and atypical forms. Therefore, the clinical notes here given are important.

I. *Keratoconus of rapid development consecutive to exuberant pericorneal conjunctivitis.*

For many years I have insisted that vernal conjunctivitis develops an irregular astigmatism in eyes emmetropic before being affected by such conjunctivitis.

In the second annual meeting of the Mexican Ophthalmic Society in 1905,¹ and later in the third meeting of the same society,² I presented some observations on patients with vernal catarrh whom I had the opportunity to observe from the beginning of their affection and for several years thereafter. In all these cases, free from ametropia in the beginning, I saw a compound irregular myopic astigmatism develop, with the exception of a single case in which the astigmatism was hypermetropic.

Convinced that my patients were emmetropes from the onset of their vernal catarrh and having seen not only the appearance of ametropia, but its increase in a short time (up to 2

diopeters in three years, in one case), naturally I attributed the change to the vernal catarrh, for these three reasons: First, the conjunctival disease appears in the eyes of children, eyes in the course of development; second, the nutritive modifications which the pericorneal infiltration must bring to the cornea; and, third and very important, because of the mechanical influence of the pressure and friction thru the closed eyelids, which the little patients constantly rub with their fingers, in order to calm the most persistent subjective symptom and annoyance of the disease, the itching.

In one or another meeting of the ophthalmic society my observations seem to have been received with a certain skepticism, as one could see in the minutes published in their reports.

Now I bring the new observation made on a young girl affected with vernal catarrh, in whom I have seen appear and develop in two years a decided keratoconus. This observation is highly demonstrative that the vernal catarrh has etiologic influence in producing the malformations of the cornea which cause ametropia and corroborates my previous observations, giving undeniable proof of the view I have sustained for several years.

Case I.—Miss R. S., at present twenty years of age, of Conguripo (State

of Michoacán), presented herself for the first time in my ophthalmologic office in 1913, then sixteen years old, for treatment of an ocular affection which began two years previously. Careful examination showed me that she suffered from a bulbar form of the exuberant pericorneal conjunctivitis, without participation of the tarsal conjunctiva, with opalescent infiltration of the limbus towards the superior portion and big pericorneal nodules in one or both extremities of the horizontal meridian, in the uncovered parts of the conjunctiva. The characteristic subjective symptom of this disease—the itching—was intense. As usual, the patient showed alternately improvement in the winter months and exacerbations in the hot months; but as the climate in which the patient lives is hot, the improvements in winter were slight.

On refracting her, I found both eyes completely emmetropic, with sharp visual acuity equal to normal. I treated the patient for several weeks and after that she went to her home.

In 1916 she returned to my office, and what was my surprise in finding in both eyes an enormous keratoconus, perfectly transparent, and with the vision below one-twentieth. Of course, the vernal catarrh has not disappeared.

Looking at one or the other eye in profile, a glance brought to notice the accentuated conical form of the cornea. Examining the superficial transparent membranes with the keratoscopic disc of Placido, it showed a characteristic malformation of the concentric circles.

The anterior chamber was deep. Iris, refractive media and the ocular fundi, normal. Vision R. 1/25; L. 1/50.

Refraction: Irregular myopic astigmatism. The skiascopic examination showed at once the annular shadow, concentric at the pupillary border, with its center illuminated—a shadow which is almost characteristic of keratoconus, altho it is observed also in lenticonus. On rotating the reflecting mirror the annular shadow showed irregular movements and deformities. In causing the patient to look in different directions, in order to retinoscope the

peripheral parts of the cornea, we observed the two luminous bands which had the scissors movement as it appears in irregular astigmatism.

The refraction of the extreme meridians was the following: R. oblique meridian 25° . —9D; meridian at 90° . —13D. L. oblique meridian at 160° . —9D, oblique meridian at 80° . —15D. The correcting lenses hardly improved the vision for distance. Also the visual acuity for reading distance was notably decreased.

What is interesting in this case is the complete absence of any hereditary record (I have examined her parents, her maternal grandmother and some uncles, and none of them presented any errors of refraction) as well as the rapidity with which the keratoconus developed.

Did this vernal conjunctivitis cause the keratoconus? We do not apply the *post hoc ergo propter hoc* principle, but we must reflect on all this detail: 1st the absence of any other cause; 2nd the previous affection, with its intense pericorneal infiltration, naturally produced nutritive modifications in the cornea, which decreased its resistance to the intraocular pressure; and 3rd the continued frictions and rubbing practiced on the cornea through the closed eyelids, in order to relieve the itching, mechanically flattening the transparent membrane, must also modify its elasticity.

The ignorance in which we still are about the real pathogenesis of keratoconus, does not permit us to estimate the influence of each one of these causes, considered separately; but surely, united, they have not been foreign to the production of the bilateral keratoconus in our patient.

In speaking of the prognosis of vernal conjunctivitis, one must take into account the possibility that in time it may produce astigmatism, that would diminish the vision of the patient. It is customary in my office to study the refraction of all patients who have been suffering several years from vernal catarrh. This has caused me to observe the emmetropia at the beginning of the illness and to later discover the

ametropia, almost always myopic astigmatism.

When the patient does not present any error of refraction, I am so convinced that the vernal conjunctivitis can cause it, that I always advise the patients of this possibility, in order that they may be warned.

We can see that if, exceptionally, the vernal conjunctivitis produces corneal alterations able to disturb its transparency, it is not so rare that it produces modifications in the curvature of this transparent membrane, which always decreases the visual acuity.

X-rays and the therapeutics of exuberant pericorneal conjunctivitis.

Is the use of the X-rays in the treatment of the periodic vegetative conjunctivitis, as Dr. Antonelli calls it, rational?

The question must be cleared a priori by considering the pathologic histology of the affection, and the special action of the X-rays; and a posteriori, by observing the results obtained in the clinic.

The most notable in the histologic lesions of the vernal catarrh is the proliferation of the epithelial cells, accompanied by a proliferation of the subepithelial tissue, the epithelial hypertrophy predominating in the bulbar regions, and the conjunctival proliferation in the tarsus (Taylor and Danvers). The European histologists and our Mexican histologists are in accord on this point. According to Dr. Antonelli³, the epithelium is not very much changed, but very much thickened. There exists an infiltration of small cells which constitute a granulomatous focus of leucocytes. There are numerous spaces and cystic cavities of three species; cysts of vacuity by degeneration of the epithelial cells; small lymphatic cysts; and, at last, isolated cavities well formed in the fibrous stroma. Antonelli believes that vernal catarrh is a chronic inflammatory process of the conjunctiva, which terminates in vegetations without it being possible to know the cause.

In some cases, the leucocytic infiltration is so abundant that it has caused

Michel to think that the primary lesion is a lymphoid nodule.

Our histologist Dr. M. Toussaint⁴, had said: "In short, the alterations consist of the epithelium being thickened in some places and thinned in others, and infiltrated by leucocytes, to a point that the subepithelial tissue presents the aspect of an abundantly vascularized infectious granuloma. Before Dr. Antonelli, Dr. Toussaint had already mentioned the existence of holes or vacuoles, some of these occupied by small migratory cells.

Another of our histologists, Dr. Ricardo Cicero (in the thesis of Dr. Chavez, already mentioned), divides the lesions into superficial epithelial ones, and lesions of the subepithelial layers. In the first he finds an active epithelial proliferation with a mucous degeneration of the cells; as to the subepithelial layer it has a texture similar to the infectious granuloma, there is an agglomeration of embryonic cells, tightly packed among themselves, and some of these acquire fusiform shape and have serous infiltration, the cavities are fairly abundant and some fibers of conjunctival tissue cross between the epithelial cells. We see, therefore, that there are numerous young cells of new formation, and, at times, lymphoid nodules.

"The X-rays act principally on the lymphoid system and on the young tissues of new formation."⁵ From all that precedes we can a priori affirm that the X-rays must have a beneficial influence in the exuberant pericorneal conjunctivitis; as its indication is based on two scientific data of the greatest importance; the histologic nature of the vegetations, and the special action of X-rays on new formations of that nature.

Now let us see what the clinic says a posteriori. All my patients with vernal catarrh whose history I will briefly mention, have been treated by the Roentgen therapy in the office of Dr. Cornelio Larios, of the city of Leon.

The tube employed is focussed with an automatic vacuum regulator; there is always used a protective screen and a localizing diaphragm, in order to

limit the action of the X-rays to the desired part. The quality of the X-rays that we have used is from 6 to 7 of Benoist radiochromometer.

The quantity is estimated by the calorimetric apparatus or radiometer of Sabouraud-Noiré, composed of screens of platino-cyanide of barium. It never reaches the quantity of 5 H. We are therefore, very far from having ocular lesions, above all in the retina and the optic nerve, as observed by Birch-Hirschfeld in those cases in which the eye has been exposed to the radiations of 25 units of Holzknacht.

The precautions taken are so much more necessary because the patients frequently are children whose eyes, in course of development are more susceptible to the action of the X-rays, than the eyes of adults, according to the investigations of Tribondeau and Belley, mentioned by Dr. Leprince⁶ of Bourges.

The duration of the exposure never lasts more than 8 minutes, the eyes are kept open, and the upper eyelid is inverted when it is a tarsal case, although this detail is not indispensable. Frequently repeated exposures have never been needed. As a general rule they have been practiced every three weeks or at longer intervals.

During the first days which follow each exposure to X-rays the patient does not feel any inconvenience. But two or three days after, as it were following a period of incubation, one observes an exacerbation of all the symptoms of vernal catarrh. The vascular injection of the conjunctiva is more intense, the vegetations increase in volume and a slight mucous secretion appears, even in cases which did not present it before. There is a sensation of foreign bodies in the conjunctiva, the itching increases, and in a very few cases, there exists a slight photophobia. This exacerbation lasts a few days, without opaqueness of the cornea or iritic phenomena, or fundus lesions, or the slightest diminution of visual acuity, or any symptoms of radio-dermatitis. At the end of fifteen days, all has come to its old condition, and, from that moment, begins regression of

the lesions of the limbus and tarsus. If after three weeks or one month the improvement has not been very marked, a new exposure of the eyes is made to Roentgen radiation.

This method of procedure differs from that which has been in use by others, such as Casey Wood⁷ of Chicago, who mentions the case of a little girl afflicted in one eye only with vernal catarrh of the tarsal variety, whose affected parts were exposed daily, during six weeks to the action of the X-rays.

On the other hand, this method is similar to the manner in which Drs. Davidson and Lawson⁸ have applied the radiations of radium in a case of vernal catarrh. They practiced the treatment during one year, and, in this time each eye was subjected to eight radiations, without ever observing any accidents or without obtaining a complete cure. In order to appreciate the therapeutic result it is necessary to recall the evolution of vernal catarrh in our country. The unfavorable influence of heat on the affection which we are studying being unquestionable, in countries where the seasons are more marked, so are the periods of exacerbation and improvement, the first coinciding with the spring—hence its name—and the second with winter. All of our Mexican oculists are in accord with that, in our country the course of the disease varies a little, owing to our special climatic conditions.

The patients whom I observe all live—with few exceptions—on the Central Plateau, which is located between 1,000 and 2,000 meters above sea level, whose climate is temperate and whose winters are not very severe. The disease follows this course: It is chronic, lasts several years—I have seen it lasting from the age of twelve to the age of twenty-six; it begins with childhood—I have seen it even in children four years of age; it generally attenuates with age and disappears in adolescence. Once it has appeared it simply shows variations of aggravation and improvement, without completely disappearing during the winter. The exacerbation begins in February, accentuates in March and April and keeps

its intensity during May, June, July, August and September. It begins to improve in October and the improvement reaches its apex in December and January.

Improvement in spring or summer and complete disappearance in winter is exceptional. I have observed it in patients with X-rays. However, I do not speak of cure except when they have passed one or two years without a relapse in spring and summer. This is the view of Doctors Zentmayer, Wood and Carpenter⁹.

Here briefly are some of my most important observations.

Case 1:—A. M. twelve years of age from Lagos de Moreno, State of Jalisco, a city of temperate climate. He has been suffering for years from an ocular affection for which he came the 18th of March, 1916, as his disease began to show an exacerbation. I found him affected with vernal catarrh, of the bulbar and tarsal variety, with large pericorneal nodules, and abundant tarsal vegetations. There was hardly any secretion, but he suffered intense itching. I always obtain improvement with the following treatment: two drops twice daily of a 5 per cent solution of argyrol, and two drops of this formula: sterilized water 10 grams, solution of 1:1000 of adrenalin 1 gram, hydrochloride of cocain 0.05 centigrams; ointment of Verges of yellow oxide, 2 per cent every two or three days; and daily steaming with Lorenzo's vaporizator.

I prescribed all of this, and the treatment was followed for some days; but as he could not remain in the city, he asked me for some means to alleviate his sufferings as soon as possible. I used the X-rays. An eight minute exposure was made, following the precautions already indicated; after four or five days of incubation the reaction of which I spoke appeared, which got better at the end of two weeks. The patient returned to his residence and I advised him to use only the argyrol and the cocain-adrenalin solutions.

On the following 28th of April he again presented himself much im-

proved. The pericorneal nodules had almost disappeared and the tarsal exuberances greatly diminished. At the limbus persisted, that whitish enlargement toward the upper part of the cornea so well described by Uribe Troncoso¹⁰ and which is for me one of the symptoms which help me most in establishing the diagnosis. The itching had improved. I must call the attention to this improvement, observed in full spring, when in previous years it was the most painful time for the patient. After a new application of X-rays he returned home where he followed the previous treatment.

On the 18th of June he consulted me again. There was complete disappearance of the tarsal exuberances in the left eye, hardly perceptible in the right eye; disappearance of the limbal inflammation and of the pericorneal nodules; the itching has almost disappeared. Owing to this evident improvement no application of X-rays was made and the previous treatment was continued. On the twelfth of August, the tarsal conjunctivas were smooth, there remained only a slight vascularization in spots very limited in both eyes, about where the pericorneal vegetations existed; no itching. From that date, and during the hot months of 1917 the affection did not recur. I cured it in full summer with only two applications of X-rays.

Case 2. Child five years of age, from Lagos de Moreno (Jalisco), bulbar form of vernal catarrh; limbal inflammation toward the upper part, and pericorneal nodules in the part uncovered by the lids. Nothing in the tarsal conjunctiva. He consulted me in March, 1915. As the affection was recent, I thought that the case was a favorable one for the application of X-rays; and a five-minute exposure was made on each eye. After three or four days of incubation, the symptoms of radio-conjunctivitis appeared, but not very intense. They lasted ten days. They attenuated immediately, and then began the improvement of all symptoms of vernal catarrh; which disappeared completely in two months, in full

spring, after a single application of X-rays, and with only the aid of-argyrol and the instillations of cocain-adrenalin.

The year 1916 passed well, but at the end of February, 1917, the patient was brought to me again with some tarsal conjunctivitis; slight thickening of the conjunctiva towards the external side of the horizontal diameter, in both eyes; a small nodule of exuberant perikeratitic conjunctivitis in the right eye. After new applications of X-rays, the phenomena of reaction were of small intensity during the first fifteen days. Then there was progressive improvement of the affection, until cure in full spring. He passed the summer well and continues well.

Case 3: Miss R. S. 20 years of age of Conguripo (Michoacan), a warm climate.

This is the same girl in whom developed keratoconus. Application of X-rays in May, 1916; reactionary phenomena intense, with mucous secretion, slight photophobia, marked hyperemia of the conjunctivas, and engorgement of the vegetations. With daily vaporizations with Lorenzo's apparatus and instillations of the cocain-adrenalin solution, the reaction disappeared in fifteen days, and the improvement began. Cessation of the itching, disappearance of the secretion and of the photophobia; marked lessening of the hyperemia and of the pericorneal vegetations. After a month, new application of the X-ray; less intense reactionary phenomena followed by marked improvement in spite of the hottest days in July. Unfortunately I have not seen the patient again, as she returned to the place of her residence, rather distant, and altho she wrote me that she continued being better, I cannot give any more details. The miotics and the compresses have been the remedies employed for the keratoconus.

Cases 4, 5 and 6: Three cases of the tarsal variety, without participation of the bulbar conjunctiva. Mr. A. H. 25 years of age of Oaxtlan, Jalisco (temperate climate). Mrs. A. H. 30 years of age of Aguas Calientes, and Mrs. H.

R. 23 years of age, of Aguas Calientes. These three suffered for years exclusively from the tarsal form of vernal catarrh, with very voluminous vegetations limited to the tarsus, without participation either of the transitional folds or of the bulbar conjunctiva. The itching in all was intense, and in none of them was there any secretion. They presented themselves during the hot months of the year. Each one underwent, with intervals of one month, two exposures—the lids being inverted—to the radiations of Roentgen. The reactionary phenomena were not intense and the improvement evident. The subjective symptoms of itching, and the volume of the tarsal exuberances notably diminished in full summer.

As a year has not yet passed, we can not consider the cure definite; but it is to be noted that none have heretofore felt such great improvement.

These observations, especially the first two, show that Oram Ring¹¹ was right in asserting that the X-rays have an evident therapeutic value in vernal catarrh.

III. *Very large recurrent vegetation which invaded the cornea and yielded to the X-rays.*

The exaggerated development of tarsal vegetations in exuberant conjunctivitis has been observed several times. I had the opportunity to observe in a young person, 16 years of age, a very interesting case, in which, besides the numerous small pavementlike vegetations, like the pavement of the street, existed in each upper lid, three or four vegetations of enormous development, up to $\frac{1}{2}$ cm. long, and with a base of narrow implantation: I had to extirpate them for the inconvenience they caused the patient.

Another interesting case in a girl, 14 years of age, was presented by our distinguished oculist, Dr. Daniel Velez,¹² under the name giant papillomas of the tarsal conjunctiva in vernal catarrh. The histologic examination of one of these papillomas, made by Dr. M. Toussaint, showed the peripheral layer formed by a stratified pavement-like epithelium, with numerous swollen cells, some of these cells are vesicular

and among them there are migrating cells. The rest of the small tumor consists of a very vascular fasciculated tissue, and among large agglomerations of cells, some small ones, without much protoplasm and with nuclei rich in coloring matter, others are large with an abundance of protoplasm and consisting of two types: plasma cells of Unna and granular cells of Ehrlich. The histology of these tarsal vegetations is identical with that of the other lesions of vernal catarrh. In spite of my bibliographic investigation, I have not found a case similar to that which I am going to describe, as when the cornea has been invaded to some extent, no vegetation has taken an exaggerated development.

Case 7. The boy, age 13 years, of Aguas Calientes, was brought by his father to my office in April, 1911, in order to have a small tumor, developed in the left eye, attended to. The eye had been operated on three times; once in Aguas Calientes, by an oculist who visited the city, whose name he did not know; another time in San Luis Potosi, by the well known oculist Dr. Antonio Alonso, and the last time in Mexico, by the distinguished ophthalmologist Dr. Fernando Lopez, who applied the galvanocautery. In each case the tumor recurred in a few months, acquiring a large volume.

Examining the young boy I discovered what one observes in the oil painting which I took from nature, see plate VII. In the right eye is a bluish-white infiltration of the corneal limbus, toward the external part, a diffused, vascularized enlargement of the conjunctiva to a large extent around the limbus; and vegetations of the tarsal conjunctiva, separated by well marked furrows. The fornix and the inferior palpebral conjunctiva were normal. There was a slight mucous secretion. It is to be remembered that it was in the month of April—and there was a very accentuated itching.

In the left eye the tarsal manifestations were similar to those of the right eye. In the bulbar conjunctiva there existed, towards the internal angle a large diffused vegetation; and on the

cornea another large hemispheric vegetation of the size of a split pea, of a reddish yellow color, and obstructing already almost half of the pupillary field. One could notice also in the cornea a whitish cicatrix, linear, vertical, almost tangent to the small tumor, a trace of the operation practiced in Mexico by means of the galvanocautery.

According to the father of the patient, the affection was of two or three years' standing, and was getting worse during the hot months of the year. The clinical diagnosis was unmistakable; it was a case of exuberant perikeratitic conjunctivitis in its tarsal and bulbar forms, and one of the vegetations had come to a considerable development, invading the cornea, and seriously affecting the vision.

The prognosis was not encouraging; the recurrence of the large corneal vegetation, in spite of the well known ability of the operators, left me doubtful, and obliged me to look for positive therapeutics to remedy the condition.

I proposed to the father of the patient, and he accepted, to make a fourth extirpation of the enormous corneal vegetation, in order to see if it were possible to avoid recurrences which were making the case desperate; and then we would apply X-rays.

This was done. During the operation the vascularization of the tumor was ascertained, and as the adhesion to the membrana propria of the cornea was very pronounced, it was necessary to leave a thin layer of the vegetation. A five-minute exposure to the Roentgen rays was made, exclusively localized to the left eye.

As the reactionary phenomena were not very marked, we continued exposing the eye during five minutes every fifteen days for two months, at the end of which time we suspended them, because the radiometer of Sabouraud had indicated the limit of absorption.

As the recurrence of the corneal vegetation was generally evident at the end of two months, and at this time it had not yet appeared, I began to hope that the recurrence would not again reappear. However, the father of the

patient and I, being watchful, did not let the boy go home for four months, with the injunction to present himself each month, for the application of other radiations. Effectively they were applied twice more. I have observed the patient for years. Since 1911 I have not lost sight of him, and in more than six years there has not only been no recurrence of the tumor, but all the conjunctival lesions have disappeared in the left eye, there remaining only an intense opacity of the cornea in the former site of the vegetations, and the vertical cicatrix of the galvanocautery.

A very interesting detail which converts this case into real proof of experimentation is: As the young boy and his father were afraid that the X-rays might have a bad effect on the retina—as some suggested to them—they wanted me to expose only the eye with the tumor, whose vision was already affected, and to not touch the right eye, which it was necessary to protect specially. The tarsal and bulbar lesions of this side did not improve equally with those of the other. They continued with the summer and spring exacerbations of bad to worse, and win-

ter improvements. Submitted to cocain-adrenalin and argyrol, the tarsal and pericorneal lesions improved gradually, perhaps rather on account of the spontaneous tendency that the disease has to improve.

A final detail: The left eye now presents a mixed astigmatism, horizontal meridian $+4$ D., vertical meridian -1 D.

The visual acuity is R. = 1. L. without optical correction = 0.5.

For purposes of comparison I remember some twenty-five cases of exuberant perikeratitic conjunctivitis, not treated by X-rays; which followed the course that we all know, some lasting fourteen years, others disappearing at the end of 3, 4, or 8 years.

I now attend a little girl of Lagos de Moreno, aged 8 years, who for two years has been suffering from exuberant conjunctivitis, and each year, in the warm months, comes to me for attendance; her father has not permitted the application of X-rays; and the yellow oxid of mercury, vaporization cocain-adrenalin and argyrol, have on her a beneficial effect, but without curing her.

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VERNAL CONJUNCTIVITIS IN CUBA.

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HAVANA, CUBA.

Attention is here called to the unappreciated frequency of vernal conjunctivitis, and illustrative cases are given to prove its identity altho its course is modified by special climatic conditions.

The cases of spring catarrh seen in Cuba, like those of trachoma, do not always show the same typical signs of the disease as are seen elsewhere, and as they are not frequent, the diagnosis is not easy, and the disease can be mistaken for other conjunctival diseases including trachoma.

Most of the authors agree that this disease is rarely seen after the age of twenty, but the most typical case we have seen was in a woman of 40 years. The disease attacks by preference males. This we have verified here, but not its dependence on the climatic conditions that elsewhere seem to have such an influence that the disease is called by the name of vernal conjunctivitis. This can be explained by the fact that in Cuba we have summer almost all the time, with the exception of a few weeks of moderately cool (not cold), weather.

Both eyes are usually affected, and there are photophobia, itching, and catarrhal symptoms without mucus. The tarsal conjunctiva presents a whitish, milky, lardaceous aspect. The disease was mentioned by Arlt in 1846, and well described by him in 1851. He believed the transparent, gelatinous infiltration of the conjunctiva, near the limbus, to be a lymphatic manifestation. We remember that the same impression was made upon us when we saw our first case in Cuba; and we thought that with the growing up of the young patient the disease would disappear, but it was not so.

Saemisch gave to the disease the name of vernal conjunctivitis on account of its tendency to recur in the spring of the year; and to be almost well in the beginning of the cold weather. In Cuba, as we said, the disease is not modified in those months.

The disease has been called in Mexico, exuberant circumcorneal conjunctivitis. The author that studied it there was Dr. Carmona Valle, and he found the chief symptoms in the bulbar conjunctiva.

The duration of the disease can not be stated, but Saemisch has seen 23 successive attacks in a case during one year. Most of the cases are soon persuaded of the benignity of the disease, and the long treatment wearies them, and they abstain from further treatment.

The frequency of the disease varies. Danvers at Parma had 50 cases among 22,398 patients; Schoebel, at Prague, had 23 cases in 20,000 patients; Schiess-Gemuseus, of Basle, had 14 cases among 28,338 patients; Emmert, of Berne, in 12,486 patients had 48 cases; Knus, from Zurich, in 33,609 patients, saw 64 cases, and Kubli, of Petrograd, among 20,690 patients, only 2 cases. In Cuba, in 61,000 patients we have seen only six cases of the disease.

According to the statistics, the most frequent month is May, but in our cases the months of January, February and April are more frequent. All our cases were from the city, and none from the country. We have not been able to prove any contagiousness, nor have we found any possible bacterial agent as the cause.

All the different treatments used to combat the various affections of the conjunctiva are without good results, when employed in this disease. To-day the use of radium is recommended and it shall be employed in one of our cases, and we hope with good results.

We remember the discussion held in the Ophthalmological Section of the A. M. A. in May, 1903, by Drs. Posey, from Philadelphia; Weeks, from New

York; Gradle, from Chicago; Zentmayer, Baker, Woods, Stevenson, Stricker, Gifford, Claiborne, Randolph and others; and in spite of the different opinions, the impression was that there is no recognized etiology, and that all treatments were of no avail.

Three years previously, in March, 1901, Dr. Antonelli held the same doubts at the French Ophthalmological Society, concerning the symptoms, etiology and treatment.

As we have said before, the disease has been studied by Montaña, Velez, Chavez, Uribe-Troncoso, Toussaint and others, at a meeting of the Mexican Ophthalmological Society in July, 1904. At that time Dr. Toussaint showed his microscopic researches, which did not prove anything special, and only enforced the opinion that the disease is chiefly recognized by its physical signs; and did not show in Mexico, as in Cuba, a very regular course.

CASE I.—A boy, six months old, was brought to us in February 8, 1904, because his mother thought that he had suffered an injury in his right eye with a toy. But it was not so, and his eyes were in a physiologic state. The boy was again brought into our office in September 17, 1906, with a small phlyctenule of the bulbar conjunctiva, and now we believe that it may have been the beginning of the vernal conjunctivitis that he has had later. We saw him for the third time in 1907, and this time he had a purulent discharge, but the laboratory findings did not show any germs, only leucocytes.

In April, 1910, the boy was seen again by us, because his eyes were red, and there were some small raised spots on the bulbar conjunctiva, of red color and asthenic appearance. We did not then think that they were symptoms of vernal conjunctivitis. But now that the case has been so diagnosed abroad, we believe that what we thought was incipient phlyctenular conjunctivitis, was in reality an outbreak of the spring catarrh, which is not very typical in warm countries.

In May, 1913, we took out a foreign body from his right eye and it was seen

that the small lumps in the bulbar conjunctiva had disappeared. But there was still the asthenic congestion of the palpebral conjunctiva in both eyes.

The father brought me the boy on the 22nd of February, 1913, because the child had been taken out of school by the medical inspector, who thought that his son had trachoma. Three other boys had been brought to me from the same school and with the same statements; but the subject of this observation had conjunctivas with a different appearance from that of the others, the case not being one of trachoma. The parents wanted very much to have the boy operated. Altho not believing that surgical procedures would be of great advantage, I practiced a rolling of the everted lids. The case, as expected, did not improve.

In March 11, 1913, the conjunctivas presented the same aspect. Asthenopia corrected with 0.75 plus.

January 5, 1914. Eyes the same as before. Upon being asked to certify the condition I do so as follows: The fatty appearance of the conjunctiva is not due to trachoma, and will disappear on change of climate or when the boy grows up.

September, 1917.—On a visit to New York I found the boy there. The boy has since been seen by Dr. Weeks, who diagnosed the case as vernal conjunctivitis; or spring catarrh; and has recommended the use of radium, which in my belief will cure him.

CASE II.—M. G. D., a young man, consulted me in April, 1912, and had been sick three months. The left eye is the one affected. The disease began with some red spots on the bulbar conjunctiva. The case looks like one of phlyctenules, but is not so. We made a diagnosis of vernal conjunctivitis and the patient left for his town, and wrote to us some time afterwards, stating that he was better.

CASE III.—Mrs. J. G. R., 44 years old, and native of the Canary Islands, has been living 14 years in Cuba. Strange ocular appearance. The conjunctiva of the globe offered a phlyctenular and membranous appearance.

In the left eye there were corneal opacities, almost hiding the pupil.

The patient stated that she had been sick for over twenty years; the disease began at her birth place. The upper eyelids had a membranous character, and we made the diagnosis of vernal catarrh. After a month of treatment the patient left unimproved.

CASE IV.—Boy, six years old (W. P. G.), was seen first on July 24, 1912, and came into consultation for a chalazion. After everting the lids, we noticed a fatty or lardaceous infiltration that might have been diagnosed as trachoma by the health officers. We saw him again in 1915 during a trip we

made to New York, and he did not complain of his eyes then. On his coming to Havana in 1917, and upon being examined by the health authorities, he was detained and sentenced to be sent back to New York, because a diagnosis of trachoma had been made. The case was entirely similar to case I, diagnosed as spring conjunctivitis at New York. We were able to arrange things, stating that the case was certainly not one of trachoma, and taking charge of the patient. The boy, after 20 months treatment, has not gotten worse, but has certainly not improved greatly, in spite of the severe winter we have passed.

TRACHOMATOUS CHANGES OF THE CARUNCLE.

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The histologic changes in the caruncle here reported seem to throw light upon the embryologic origin of this structure.

Altho trachomatous changes affect almost all the external parts of the eye, up to date no communication has been published of its appearance in the caruncle, as far as my knowledge of the literature is concerned. I therefore wish to report herewith such a case, which I was able also to investigate histologically.

The case concerned a woman, age 21 years, with light grade trachomatous scars of both eyes. At the examination I noticed at once that the caruncle of the left eye had been changed to a tumor the size of a rice grain of grayish yellow color. This tumor was extirpated, fixed and hardened in alcohol and cut in horizontal sections embedded in celloidin. As stain I used hematoxylin (Boehmer) — eosin, and Unna—Pappenheim's mixture.

It showed on careful investigation of the sections that the tumor consists of four lymph nodules lying closely together; each nodule is provided with a

well developed but not sharply marked germinating center.

They contain also numerous, typical Leber's bodies, such as we always find in the trachoma follicle. About in the center of the tumor, i. e., between two neighboring follicles, we find a deep cone-shaped depression of the epithelium with narrow lumen, which shows the characteristics of a stratified pavement epithelium conforming to the normal structure of the epithelium of the caruncle. In the lumen of this depressed epithelium and between the epithelial cells, one observes many emigrated lymphocytes, histocytes as well as polynuclear leukocytes.

The epithelial covering of the tumor is largely stretched and thinned out, so that the underlying epithelial cells, which normally are high cylindrical, appear here more or less plainly flattened. The goblet-shaped cells which under normal conditions appear here

very often, are absent. Towards the plica semilunaris the subepithelial tissue, which was slightly scarred, is numerously impregnated with plasma cells, histocytes and lymphocytes, and passes without demarcation into the old scar of the plica.

Medially, i. e., towards the inner canthus, the subepithelial tissue appears thru the compression of the tumor more or less dense, without, however, showing a strong cellular infiltration (See illustration, Fig. 1). Considering

official consideration not to coincide with this opinion, as the caruncle resembles histologically mostly the structure of the external skin, as it contains sebaceous glands and hair follicles. Many authors, as for instance Waldeyer, Ciaccio, Cirincione, H. Virchow,² have, however, already pointed out correctly that the caruncle shows on the other hand the nature of the mucous membranes. One can find here normally mucous cells, disseminated lacrimal glands and diverse migrating cells of

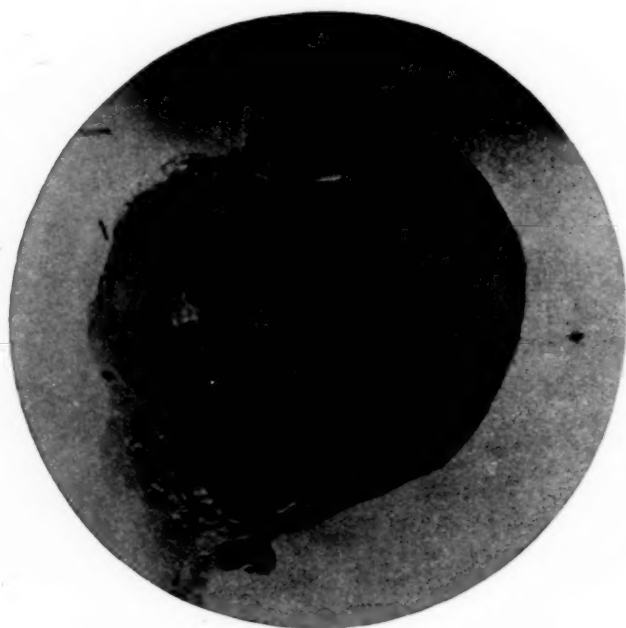


Fig. 1.—Section of caruncle showing trachomatous changes. (Hiwatari)

the above mentioned histologic findings one cannot doubt, that with the case in question we have a genuine trachomatous change of the caruncle. Thereby it is proven for the first time that the trachoma exists also in the caruncle.

Previously I was of the opinion¹ that the formation of the follicles in trachoma are closely connected with the physiologic-morphologic state of the subepithelial layer of the conjunctiva. The case in question appears by super-

varying number. The embryologic examination of Ask³ and Contino⁴ has also proven that in the formation of the caruncle both the skin and conjunctiva are concerned. That trachomatous changes of the caruncle exist, as my case proves, is therefore not at all strange.

The plasmoma formation in the caruncle, mentioned by Pokrowsky,⁵ is probably the trachomatous change, as he pointed it out himself as a kind of inflammatory granuloma.

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OPHTHALMIC PRACTICE OF TODAY AND ITS BEARING ON UNDERGRADUATE OPHTHALMIC TEACHING

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This paper was prepared for the Section on Eye, Ear, Nose and Throat of the Southern Medical Association to be read at its twelfth annual meeting, which was postponed on account of the influenza epidemic. It indicates some of the subjects that must be covered in such teaching, and various points in which ophthalmic practice and teaching diverge from general medicine and surgery, with the errors into which the uninstructed practitioner is liable to fall.

It seems trite to say that ophthalmology should be taught as modern medicine regulates, or should regulate, its practice. But when one analyzes ophthalmology to formulate rules for its teaching, based on modern practice, triteness gives place to a problem of no mean dimensions.

The study of eye anatomy involves nonvascular tissue, its complicated nutrition and drainage. The blood vessels are divided into three distinct groups, practically independent, yet, by anastomoses sometimes producing problems in diagnosis.

Eye muscles have peculiar insertions and innervations. All these make up a special anatomy which must be mastered. Ocular physiology introduces optics, vastly important from both the physical and physiologic sides. The muscles must work in harmony with visual adjustment. When ametropia is introduced, harmony is disarranged. Sometimes Nature regulates this perverted physiology; sometimes she fails and we must help. It is not always simple.

Again, there are functional eye defects produced by extraocular influences. Irritation of accommodation may result from causes which in another patient, would produce visible eye lesions. Diabetics frequently suffer

from such changes in their refraction. So do the innocent victims of hereditary syphilis. Asthenopia, accompanied by circumcorneal injection, without visible cause, especially in school children, is sometimes the forerunner of uveal disturbance. Refraction error may be absent or variable and glasses do not help. It is often hard to get reliable cycloplegia. Systemic study is as important as if a corneal infiltration were present. There is a medical side of refraction by no means negligible.

Again, consider for a moment the causation of eye diseases. Besides local infection, three causes have long been accepted: syphilis, tuberculosis and rheumatism. Idiopathy has answered the purpose when no one of these has been proven. Beyond gummatous iritis (with a question mark) interstitial keratitis, there is practically no eye lesion solely characteristic of luetic infection. No oculist today should accept a luetic origin in even these diseases or macular choroiditis without other clinical proof or positive Wassermann.

Ocular tuberculosis presents some striking features. It is rarely associated with pulmonary tuberculosis. Keratitis is not infrequent with glandular infection, while the most serious of tuberculous infections, choroiditis, is

often a local process, unassociated with general infection. Diagnosis depends upon tuberculin reaction in the eye: so-called focal reaction. This may be a serious matter. Vaccine diagnosis and treatment can be too glibly handled and one should associate with him in such cases a confrere who understands it.

Finally, "rheumatism" is now hardly a pathologic entity. The form in which it occurs with, or as a cause of, eye trouble is not acute rheumatic arthritis; for it is rare with this affliction; but, in what we still term chronic rheumatism, eye complications are abundant enough. So we must ask what this disease is. So far as I can make out, in modern medical practice, it is considered a result of an infection focus somewhere in the organism. That focus must be hunted down. This is very different from accepting a rheumatic diagnosis because there are muscle pains and we can not explain them. It is equally illogical to rely upon salines, alkalis, salicylates or potassium iodid as remedies when we do not know the underlying cause. However, sometimes we are driven back there because either our search is fruitless or, for one reason or another, the focus can not be removed. As to "idiopathy," the tonsils, sinuses, teeth, intestines, gall-bladder, have greatly reduced the number of such cases.

Thus far I have tried to outline briefly some of the essential requirements of ophthalmic practice from two points of view: refraction, which makes up probably three-fourths of our work, and causation of the commoner eye diseases. The oculist's work has alone been considered. Refraction, with its side problems, is his business; so is the etiology of eye lesions. For years we have hammered away at the general practitioner with arguments and urgings to look out for the dangers of ophthalmia neonatorum and to make more use of the eye in general diagnosis. Quite a number have responded and are themselves fair ophthalmoscopists. But they soon find they are in the most difficult part of ophthalmoscopy and they have the right to call upon us for

help; help not only in seeing changes which might escape them, but in interpreting them. Rigid and unequal pupils, tortuous vessels, increase or diminution in caliber of veins or arteries, retinal edema, exudates, hemorrhages, blurring of neuro-retinal margin, neuritis, old or recent lesion: these are some of the things about which the physician wants to know. Modern ophthalmology puts it up to the oculist to inform him. Mere statements of lesions do not fulfill his needs. Here comes in a most important procedure—perimetry. Thread-like vessels, for instance, may not be abnormal. They are one thing when the field is normal; another when there is concentric contraction for form and colors, especially if contraction advances. Enlargement of the normal scotoma, or scotomata anywhere in the field, are important.

Ocular surgery demands knowledge of, first: the technic of special operations; second, general surgical principles and antisepsis; third, modifications of these demanded by the environment and characteristics of eye tissue. Because of the situation and sensitiveness of the eye, it is impossible to get an aseptic field or to use all the requirements of clean surgery. Recently in my clinic, after a cataract operation, I spoke of the use of iodine tincture in dendritic keratitis. A student asked me why I had not painted the cornea with iodine in the cataract operation. He had seen the skin so sterilized in abdominal surgery and the question was natural. He needed light on special aseptic modifications. It is not my purpose to discuss fully these or other essentials. I am stating only what is commonly known and am doing it for the purpose of definition.

If the practice of ophthalmology requires what I have outlined, how should it be taught? I have been led to write this paper by my experience of three years on the American Board of Ophthalmic Examiners. It has been my fortune to be associated with colleagues who not only realize for themselves the extent of ophthalmology, but want to see education standardized. In the July (1918) number of the *American*

Journal of Ophthalmology, Dr. Edward Jackson, Chairman of the Board, published a most illuminating paper under the title "Defects in Education for Ophthalmic Practice." He concludes, as any one must who knows the state of undergraduate medical teaching, that this work must be largely post-graduate; but the subject of undergraduate teaching is of no less importance.

Let me give one or two examples of the practical results of its defects. In one of my examinations we had a patient with a beautiful simple extraction in one eye and in the other a mature cataract. I asked the candidate to go through the examination of the cataractous eye and tell me whether it would be worth while to operate. He answered (very sensibly as far as he went) that with normal vision in one eye, operation upon the other might not be of much use, but that if dilatation of the pupil showed the cataract was ripe it could be removed. I then asked him to throw out of consideration the operated eye and to determine whether or not there was essential probability of extraction improving vision in the other. His reply was that he could not tell until he removed the ripe cataract. "What good would it do," I asked, "to remove the cataract if the retina or nerve were out of commission?" His reply was, "None, but I can not tell their condition through an opaque lens. I can not see them." That man had been in practice nearly ten years. Had I asked him about light perception, light projection, pupillary reaction, *per se*, he doubtless would have answered correctly; but when it came to applying these physiologic facts to eye surgery, he apparently had never thought of it. In another examination a man who had a good many years of practice told me that he had never had time to take fields because he was too busy with refraction work and ordinary diseases. I asked him how he would make a diagnosis of toxic amblyopia. His naive reply was, "By the history and failure to improve vision with glasses."

Young men are not to be blamed for this. Those of us who hope we have trained ourselves to a higher level of thought, thrashed through the same things until self-dissatisfaction drove us to something better. They and we were taught in our under-graduate life along certain lines. This was followed by the selection of ophthalmology as a specialty. Selection was based upon conceptions which resulted from former teaching. If the latter was faulty, we reasoned on a wrong basis. Early impressions last, and it needs a good deal of determination or hard knocks to throw them off. Maybe, after graduation, dispensary or hospital service was obtained or a brief post-graduate course taken in some clinic, where, as Jackson says, there were ample opportunities for observation of which we could not take full advantage because of our former defective training.

On account of the magnitude of ophthalmology and the impossibility of teaching it adequately in undergraduate life, we have reduced our undergraduate teaching to what we term essentials. In this we have been guilty of two blunders—first, over-specialism; and second, over-simplicity. The former has tended to divorce ophthalmology, at least in the thoughts of the students, from general medicine. The second has failed to train them in the application of pathologic principles to ocular defects. As an example of over-specialism, I want to give an observation of a good many years ago. I visited the clinic of one of our then leading ophthalmic teachers. The chief brought in a patient, a tall spare man in his thirties, who had the stare and gait of the victim of recent nerve atrophy. He had a little vision left. The Professor called attention to the stare, to the dilated pupils and ventured the prophecy that on examination he would find nerve atrophy. So, indeed, he did and reported the fact to the students, none of whom were invited to use the ophthalmoscope. The Chief of the Clinic then whispered something to the Professor and, failing to get a satisfactory reply, repeated what he had said. Then came the reply out

loud: "I don't care if there is a history of syphilis in any stage; the man has nerve atrophy. Bring in the next patient."

The Clinic over, the Chief asked me to stay and go with him to the Dispensary. There was our patient and the Doctor pointed out ataxic gait, lost patellar reflex, etc. Even at that time—in the 1880's—the relation between early nerve atrophy and tabes was well known. All that side of an instructive case, however, was wasted so far as the students were concerned; no cause was given for the atrophy, no outline of investigation suggested by ocular conditions, and the one lesson the youngsters got was the wonderful professional acumen which enabled the lecturer to prophesy nerve atrophy. Only the eye lesion was discussed. If this justly distinguished teacher can be properly criticised for an over-specialized viewpoint thirty odd years ago—as, I think, he can—how much greater the sin of teachers of today who fall into the same erroneous method! Not all cases of nerve atrophy show so clear an explanation as did this. Often from the clinical point of view there is no cause. But what is the duty of the oculist? Blindness is bad enough, but there are conditions which may be added to blindness that can make suffering infinitely worse. The laboratory man, internist and neurologist should take up the study of possibly impending paresis or multiple sclerosis. The oculist should see this started, at least. Treatment, already too long delayed, might avert worse consequences.

Undergraduates should see a close relation between ophthalmology and all departments of medicine. The very presence of optics, with its essential physical, apart from physiologic, problems, has contributed to loose thinking. The optometrist has not been slow to take advantage of this and to spread a propaganda which has, so to speak, taken in a good many practitioners. Having graduated with vague, indefinite ideas of ophthalmology, a physician thinks of the eyes as a cause of headache, for instance. Rely-

ing on his own judgment, he wants "the eyes excluded first." He sends the patient to an optometrist, where some seeming refraction error may be corrected, or, at least, made an excuse for selling a pair of lenses. The patient is satisfied that he has done all demanded along that line, the busy doctor forgets or waits for results from glasses before a clinical study. There often result wasted time and unnecessary suffering if nothing worse. Whose fault is it that the doctor going into general practice from the student bench has this false idea of a part of medicine which touches every other part? Whose but the man who taught him? Had proper insistence been laid upon ametropia as one of many possible causes of headache, and emphasis, on differential diagnosis, two results would have followed: the man who afterward became an internist would have become a better diagnostician, and the one who selected a specialty a better doctor. The former would have realized the essential medical nature of the case. Over-specialism did the mischief to both men. Both started with the wrong viewpoint.

I mentioned over-simplicity as another error in undergraduate teaching. Essentially, as Jackson, my lamented friend Wendell Reber and others have insisted, ophthalmology, to be learned thoroly, must be post-graduate standardized work; but that does not relieve the undergraduate teachers of responsibility for giving the future specialist proper data on which to base his life work decision, and the future physician a right conception of the relation of the eye to general medicine. With the mixed class and fear of teaching over the heads of most of them, there has come a simplicity of teaching that has made our work little more than presentation of isolated facts. If not linked with pathologic principles, these facts form a wrong basis of thought—unless thinking is put aside entirely—for the man contemplating ophthalmology. They make him look on the specialty as something requiring little medicine. The student who

goes into general medicine forgets them altogether. Neither man will be thus deceived if the ophthalmic teacher realizes that at his clinic and didactic lecture, and in prescribing reading, he has an opportunity of pushing home lessons in general medicine. This might be illustrated from numerous points. Let me take but one—corneal ulceration. Mention has been made of our efforts to prevent the sacrifice of babies' eyes. Integrity of the corneal epithelium is essential if the eyes are to withstand the inroads of infection. Two lessons at once follow: first, the necessity of gentle manipulation in cleaning, together with the danger of an untrained hand introducing a cotton-armed applicator beneath the lids; and secondly, the routine use of cocaine to relieve pain following the nitrat of silver drop. If told "why" not only is the fact impressed, but lessons in the function of epithelial tissue are sent home. Or, take the course of an ordinary corneal ulcer from infection to healing. If we make the student understand that injury to sight depends upon density and situation of the nebula or leucoma, we have accomplished something. If we stop there we have done nothing of permanent value. Circumcorneal injection follows the infection. Why? Here are opened pathways for teaching the general behavior of vascular tissue adjoining and nourishing nonvascular structures when something goes wrong with the latter. Atropia usually benefits corneal ulceration, prevents complications and relieves pain. Why? Hyperemia, through anastomosis, congestion and exudates come to our minds. Tell him atropia is used to prevent secondary iritis and he will forget it. Show him why, and he will remember and learn something else besides. A number of years ago I accidentally used the expression "putting a therapeutic ligature on the iridic vessels." If one man has told me that this started him on valuable thinking, a score have.

Cocain as a routine analgesic is positively harmful in corneal ulceration. Go farther; show the function of corneal epithelium in the healing of an ulcer, make clear that the appearance of ves-

sels, shooting their noses from the conjunctiva over the cornea is a harbinger of better things, explain the necessity for these steps toward health and then compare the action of cocain on both epithelium and vessels with what we want, and you have accomplished several things. You have taught ophthalmology and have also linked it with general pathology. You have inseparably connected eye troubles with the basis of all good medical thinking. You can go further, if you choose; you can compare the action of holocain on the vessels and its sparing of the corneal epithelium with cocain. You can show why heat usually helps healing; also, why it may be harmful if the ulcer is associated with purulent ophthalmia; why cold, used for the latter, may do harm to the ulcer. I give this merely as an example of what I mean by linking up general medicine with undergraduate teaching of ophthalmology.

One can think of many other examples. Hypopyon, if presented as a complication of dangerous ulcers, will make no lasting impression; but if explained as an example of the formation of germ-free pus cells in the neighborhood of infection, and that for that very reason it seldom calls for surgical interference, the whole line of thought is changed. It teaches pathology. One could illustrate this by examples taken from lid, uveal, retinal or nerve diseases; but it seems unnecessary to do so.

What I want to make clear is this: the experience of the Examining Board has shown a general lack of appreciation of this method of teaching. There have been conspicuous exceptions. Some teachers are awake to facts; but, many, judging from what we have seen, are following the old course of over-specializing on the one hand and reducing ophthalmic teaching to little more than presentation of facts on the other. It is unfair to students and to the public they will have to serve.

The Board's work of standardizing ophthalmic teaching was necessarily interrupted by the war. When reundertaken, it will, of necessity, chiefly concern postgraduate work. It will en-

deavor to influence undergraduate instruction to the extent of urging teachers to give men a proper basis of thought. Without it, the first task of men entering ophthalmology will be to unlearn a great deal they think they know. So to present ophthalmology to the undergraduate as to impress the man destined for general practice with the truth that this specialty touches general medicine everywhere and that he must include it in his thinking, and to show the future ophthalmologist that in selecting ophthalmology he is not leaving general medicine behind but is merely selecting one branch of practice to which he must apply the principles of general medicine—this is the real problem. How can it be better solved than by founding special teaching on general pathology? If it means more work for the teacher, he must accept it. He should have smear preparations made in his clinic. If he reviews iritis from its clinical side at one clinic, he should give the laboratory findings at the next—Wassermann and tuberculin tests. If an eye mus-

cle is paralyzed the neurologist should take the case for further study and report. But it is useless to pile up illustrations.

Our young men will soon be coming home from across the sea. They have had an environment in which exclusiveness, frills and academic ideas have had to take a back seat. They have had to put up with lack of advantages, right at hand at home, and have accomplished almost wonders. They will bring with them not only new methods and new thoughts, but, if I do not wrongly interpret what some of them have written me, will teach us that a lot of things we hold as almost sacred are unessential, superficial or cumbersome. Their thinking has had to be done on their feet, and it has gone back, with the best of them, to simple pathology. I mean thinking on pathologic principles. One of them wrote me recently that he was profoundly grateful every day for the "fine print in Fuchs." And this fine print is mostly an expression of physiology and pathology in ophthalmic terms.

TRAINING FOR OPHTHALMIC PRACTICE

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This paper indicates what the doctor needs to study in preparation for ophthalmic practice and how he may begin his studies. Read before the Pacific Coast Oto-Ophthalmic Society, at Salt Lake City, August 13th, 1918.

It is certain that in the near future systematic training for ophthalmic practice will largely replace the unguided, unadvised, independent working into ophthalmology that has been common in the past. There is no more essential justification of this old plan as a preparation for ophthalmic practice, than there is for the same way of getting into the practice of medicine, which was the common way until a half century ago. There can be no doubt that systematic training, with adequate laboratory facilities and instruction, will give results as much superior to those attained by unsys-

tematic, unsupervised, uninformed, irregular study, in ophthalmology, as it has in the field of general medicine.

But this is a formative period for training in ophthalmology. To shape a curriculum wisely, we need the best light that can be thrown on the subject from our individual experiences; not only the conclusions of teachers, but also the impressions of those who look back only upon their own individual difficulties and mistakes. The fact that our methods and means for study have varied so widely—have been so individual—can be helpful in planning for better ways of reaching

a more perfect result. It would be something worth while for every ophthalmologist to state briefly what has been most helpful to him in his preparation for ophthalmic practice, and what he has found to be the obstacles most difficult to overcome. All who may read this paper should write out and publish their important educational experiences.

To begin with some of my own: I was one of the very few students in the class of 1878 at the University of Pennsylvania who regularly attended the clinical lectures of Professor Norris and the special courses of Drs. S. D. Risley and E. O. Shakespeare on ophthalmology, or who got an ophthalmoscope when he graduated. But I had been in practice a year, and older colleagues were referring eye cases to me, before I ever read or heard the word glaucoma. Clinical courses are essentially not systematic, and Drs. Risley and Shakespeare only undertook to teach certain special departments of ophthalmology.

The undergraduate student of today is better taught. But until graduate teaching is also made systematic there will be such glaring deficiencies in our training for ophthalmic practice. We must have a curriculum that will cover the whole subject, so that even the man who has not covered it completely may have a chance to know wherein he is deficient.

Systematic training must begin with the fundamental branches. This is not furnished to a sufficient extent in any medical undergraduate course. In the study of the special anatomy of the eye, or physiologic optics, the need of the general medical student here dominates. When one plans to take up the special line of ophthalmic practice, he should study these subjects over again; and with much more minuteness and thoroughness. Much of the anatomy is to be studied with the microscope; and with the ophthalmoscope, which is in effect a low power microscope.

Physiologic optics should be studied largely by experiments. There should be laboratory courses, best taken with adequate apparatus and under supervi-

sion. The practitioner who is shifting from general to special practice may be able to fix up the needed apparatus at no great expense, but he will miss the supervision. It would be a real gain if young men could be induced to take these courses before getting tied down in special practice. It is certainly as well worth while to leave home for them as for the clinical courses that are so generally taken.

As to ocular anatomy we have all of us started on right lines, only we have not gone far enough. The plan of study pursued in the undergraduate course on anatomy is good; but to furnish a sufficient basis for ophthalmic surgery it must be carried to minute detail. We must deal with millimeters, not with inches. We must know how far back from the corneal margin is the attachment of the internus, how wide it is; how deep is the anterior chamber, how much of its angle is concealed by the overlapping sclera. Minute topographic anatomy is important; and dissecting, here running into microscopy, is essential.

Three lines of work must be followed: Study of the dead human eye, carried over into study of all adjoining and related parts; study of the histology of the eye, carried on by means of the eyes of lower animals obtained immediately after death, and supplemented by the study of enucleated human eyes, and those of stillborn children; and study of the living human eye with the magnifier or corneal microscope, and the ophthalmoscope. This is the branch of fundamental study fitting for ophthalmic practice that the student is usually best prepared to carry on alone, or with such help as careful reading can afford.

My own preparation to take up work on the refraction and accommodation of the eye was rather fortunate. I had studied engineering before studying medicine; and with college physics had a good deal of mathematic optics. But such preparation is accidental and exceptional. The lack of it has been felt by many ophthalmologists and strikingly manifested by some who did not feel it. In the Transactions of the

American Ophthalmological Society a former member expressed the view that an oblique position of the retina could cause regular astigmatism. Two other members indulged in a controversy as to who should have credit for priority in using two cylinders with axes crossing at an oblique angle; both in complete ignorance of the fact, that the optical effect of such a combination could be better obtained by use of one cylinder, of appropriate strength and direction, with the proper spherical lens.

When the late John Green, a graduate of Harvard, was nearly 60 years old, had been a member for twenty-five years of the American Ophthalmological Society and was a recognized authority in ophthalmology, he became so conscious of the deficiencies of his training in mathematic optics that he went to a colleague in the Faculty of Washington University, and got him to lay out for him a course in mathematics. Dr. Green studied this course, and afterwards published some of the most advanced and valuable papers on mathematic optics that have appeared in this country. That plane trigonometry is not required as a preliminary to the medical course, does not do away with the necessity for a knowledge of it, to understand clearly the first laws of refraction, or lessen the handicap that ignorance of it always proves in studying physiologic optics.

As to the pathologic anatomy and histology of the eye, the great mass of ophthalmologists fall into one of two classes; those who know they are deficient in this branch, and those who have never thought deeply or studied their cases thoroly enough to find this out. Of course, there are many sub-classes, as: Those who keep struggling along and trying to learn what they can; those who conclude they are too old or too busy to study a new branch; those who believe that an examination of their specimens by a general pathologist is all that is necessary, missing the great ocular significance of the different varieties of cells composing infiltrates, and taking some one's ipse dixit that the case is one of

sarcoma, when the diagnosis may be as obscure or as doubtful as one regarding the etiology of iritis; and the class that doesn't believe pathology would help them prescribe glasses, or extract a cataract or collect more money, or do any of the other things that their hearts are chiefly set upon.

I graduated in the last class that went out from the University of Pennsylvania without having to spend a day in a histologic or pathologic laboratory. The shadow of coming events in the new curriculum set me to working with a microscope during the days of waiting for practice. The first sarcoma I studied came from the orbit of a cow, the first fresh eyes from cats and a puppy. Yet, urged on by a sense of lacking something that I should have had, and working with fair enthusiasm, I still feel that I have missed much of the educational value of my cases; because I never had any *systematic* training in ocular pathology, or the guidance and suggestion of one who had been over the ground before me, or had made himself a master in this branch. I still hope to know more than I yet do of this subject, but the years in which such knowledge would have been of the highest value are gone. Let us give those that come after us a better chance.

It is not meant that we should all, or most of us, become expert technicians, or dispense with the aid of the men and women who make pathology their specialty. But each of us should be able to sit down with a good well-stained section, and see what is there, and appreciate its significance. We will never be masters of ophthalmology until we can do it.

The young men trained in the last few years in general pathology, as it is now taught in the best medical schools, have a broad foundation on which individual study can erect a good working knowledge of ocular pathology. But they probably more than anyone else, will appreciate the value and importance of a systematic course under skilled guidance.

Of the study of clinical and operative ophthalmology, little need be said.

No one who has had thoro training in the fundamentals of ocular anatomy, pathology and physiologic optics is likely to neglect them. Students untrained in the fundamentals leave home and eagerly crowd into large clinics for six weeks' courses; from which they can get but half the benefit that they would derive therefrom after better preparation. They pay willingly for the chance to learn the technic of operations, they are not yet prepared to advise, with benefit either to their patients, or to their own professional reputations. When they come to clinical opportunities properly trained to understand and appreciate them, there can be little doubt that they will fully profit by them.

In view of his real needs, and of the actual opportunities for instruction that are offered in America at the present time, what can we advise the student who desires to fit himself for ophthalmic practice? Assuming that he has had a good postgraduate year of hospital work in general medicine or surgery, my answer would be something like this: Begin by going thoroly over the teaching regarding the eye and its related parts as given in the larger books on anatomy, including dissection on the cadaver if possible; and with reference of each structure to the principal landmarks of the skull and of the living head. Supplement this by careful dissections of the eyes of the puppy and kitten, and histologic studies of such eyes, made on material properly fixed, cut and stained.

In addition get into the habit of making careful observations of the anatomic variations in the eye and its annexa in different patients, as the colors and structure of the iris, size of lids and palpebral opening, prominence of eyeball, abundance and characters of the lashes, position of the lacrimal puncta, distribution of the conjunctival vessels, and the orifices and bodies of the Meibomian glands. Learn to draw all the structures and appearances studied as a means of cultivating the power of exact observation; and compare such drawings with the figures found in the different books.

Finally study with the ophthalmoscope the anatomy of the normal eye ground, comparing what is seen with the account of this anatomy given in Loring's Textbook, Volume I, Lindsay Johnson's Atlas, or Adam's Ophthalmoscopic Diagnosis. Compare the different representations of variations in the normal fundus with the discussion of their anatomic basis and significance.

Such a systematic course in the anatomy of the eye is suggested to be carried on by the student himself, with such help as may be obtained by consultation with any well-trained ophthalmologist. It is not in any institution. But parts of it and opportunities for laboratory work are given in many institutions; and any of these will be helpful if the student does not overlook the points in which they fail to come up to the complete course.

Next after the course in anatomy, and over-lapping it if time is available, may come the work in physiologic optics. The trigonometry needed and the physical and geometric optics may well precede the anatomic studies. Trigonometry can be studied with any teacher of high school or college mathematics. Even if it has been studied before, a review of it will save more than the time required when it comes to the study of foci, nodal points, size of images, etc.

Physical optics should be studied with experiments. If a properly equipped physical laboratory is available, the best work can be done in it. But for the larger number who cannot enjoy its aids, much may be done with simple apparatus. A convex and a concave lens, a prism, a cylindric lens, a source of light that approximates a point, a screen of cardboard to receive the image and a graduated scale to measure distances are the essentials. These should be always at hand to reproduce the proposition stated in the book, to actually visualize and render clear what would otherwise receive only a perfunctory assent and an uncertain place in the memory.

With the needed apparatus read Hartridge, Chapters I to V, or the

corresponding chapters in the larger textbooks, as in de Schweinitz, Chapter I; Weeks, Chapter III; or Fuchs, Part III, as translated by Duane. The writer is disposed to recommend his own chapter in Volume I of the System of Norris and Oliver, because it gives the important facts of refraction, without recourse to algebraic formulas, which always present great difficulties to the student who is not habitually working with them. There are many other excellent accounts of this subject. The essential thing is to read one of them carefully, and to test every statement possible by an appropriate experiment.

After physical optics has become familiar, the actual clinical work of measuring ametropia may begin. Here more than anywhere else the thorough working out of single cases is of the highest educational value. It is better for the young refractionist to take a week of his office hours to work out one case thoroughly than to give an approximate correction in twenty cases from the same number of hours of study. With practice, speed in such work will gradually be acquired; but unless the habit of thoroughness is thus established this first essential for success in the prescribing of glasses will never be attained.

Whatever views may be held as to the need of cycloplegia in the measurement of refraction it is certain that the beginner should study many cases, both during and after cycloplegia. If he has done this he can form his own judgment with regard to cycloplegics. If he works only without cycloplegia he will never get the exact understanding of this branch of ophthalmology that everyone who engages in ophthalmic practice ought to have. In regard to disorders of ocular movements also: The same thoroughness of early studies, both the fundamental and physiologic aspects of these movements, and the minute investigation of individual cases are required.

The greater part of clinical ophthalmology is diagnosis. It is diagnosis

that requires time and thought. It is diagnosis that furnishes the foundation for therapeutic success; and in every department it demands thoroughness. The ophthalmoscopist must use both the direct and inverted image. If he neglects the former he will never see the fine fundus changes that are so important in general medicine. If he ignores the latter he will fail to see the fundus in some cases in which it is his duty to recognize changes that exist there. If he knows but one way of measuring the muscle balance, or taking the field of vision, he is not well trained for ophthalmic practice.

With regard to the therapeutics of ocular conditions. Breadth of view and exactness of application are needed. But failure in this direction is far more frequently due to lack of training in the theory and diagnosis of ocular diseases, than to neglect of actual applications of curative drugs and operations. Skill in treatment grows gradually with experience thru years of practice. The best the beginner can do toward attaining it is to lay solid foundations of anatomy, physiology, pathology, physics and chemistry on which a wise application of therapeutic agencies must always depend.

To summarize: The beginner in ophthalmic practice should realize that he is a beginner. Specialization in his work can only be justified by special knowledge which as a student of general medicine, or a general practitioner he did not possess.

This special knowledge should be gained in a certain natural order; beginning with elementary studies of which he is generally quite as ignorant as he is of desired refinements of diagnosis and therapeutic skill. These elementary studies should be taken seriously; attacked first and pursued with all the thoroughness of which he is capable.

After they are mastered he is ready to begin with profit, where it has been too common to start in the past, to make a broad clinical acquaintance with ocular defects and diseases.

CAUSES OF HETEROCHROMIA IRIDIS WITH SPECIAL REFERENCE TO PARALYSIS OF THE CERVICAL SYMPATHETIC.

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This abstract of a candidate's thesis presented for membership in the American Ophthalmological Society, includes the reports of cases, a general review of the literature of the subject, the results of experiments, and histologic observations on the effect of extirpation of the cervical sympathetic in the rabbit, the conclusions reached from the investigation, and a bibliography.

That curious condition which consists in a difference in the pigmentation of the two eyes, is regarded by the casual observer as a play or caprice of nature. This phenomenon has for centuries been noted, and was called *heteroglaucus* by Aristotle¹. One who seriously studies the subject, is at once impressed with the complexity of the situation, and soon learns that nature plays a comparatively small part in its causation. It is however only within a comparatively recent time that the pathologic aspect has been considered, and in this discussion I especially wish to draw attention to that part played by the cervical sympathetic.

Many writers have given Hutchinson² (1869) credit for first describing a difference in the color of the irides, with which cataract was associated. I by chance discovered that Lawrence³ (1853) described irregularities in the color of the iris and cited two cases; in one of slowly changing color, and another of changed color of the iris with cataract. He also quoted Wilde⁴ who mentioned the fact that heredity plays an important part in many of these abnormalities.

NOMENCLATURE

Various terms have been applied for this inequality in the color of the irides, such as *heteroglaucus* of the ancients; Weill⁵ uses the word *heterophthalmus*; *anisoiridochromia* is mentioned by Scalinci⁶ and *chromoheteropia* is suggested by Malgat⁷, who also

thinks that the word heterochromia should apply to those cases in which parts of the same iris have different colors. In those cases where a cyclitis accompanies the iris decoloration, Butler⁸ uses the term "heterochromic cyclitis," but the "Chronic Cyclitis with Decoloration of the Iris" as described by Fuchs⁹ undoubtedly gives a more accurate description of the disease, notwithstanding its long title. The commonly accepted and most universally used term *Heterochromia Iridis* exactly expresses and implies the picture from its derivation (*ἕτερος* other, *χρῶμα*) color. Other newly coined words only add disorder to an already chaotic classification of diseases.

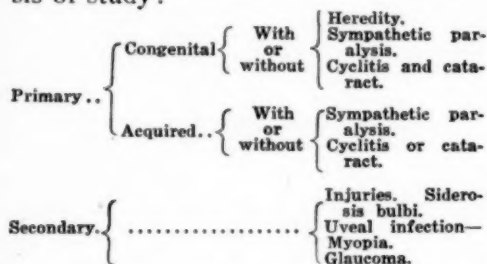
Dr. Willis H. Bocock, my friend and former professor of Greek at the University of Georgia, has suggested the word *irideterochromia*. "The *o* (as in *iridoplegia*) is not used in composition before a vowel; therefore *irid* in the word above. *Hetero* (as in *heterochromia*) loses the *h* in composition, therefore *irideterochromia*."

While it would be advantageous to have the meaning so expressed in one word, its derivation would not be as obvious as the term heterochromia iridis, unless the reader possessed a working knowledge of Greek.

CLASSIFICATION

Any exact classification of this condition is almost an impossible task, and mindful of its limitations I venture to

submit the following as a working basis of study:



Strictly speaking, as Sym¹⁰ has pointed out, there could be no such thing as a congenital form of heterochromia iridis, since it is about the twelfth or sixteenth month that the child's iris ceases to be light and takes on color. Brown pigment has however been noted to appear on the iris as early as six months.

I am not in accord with Sym and Scalinci who maintained that we should reserve the term heterochromia iridis for the instances in which there has not been any obvious pathologic process in the eye, such as glaucoma or iridocyclitis. The term expresses the condition regardless of the cause. I have recently seen a case in which there was a decoloration of the iris in an adult negro, who at first glance presented evidences of a sympathetic paralysis, namely a smaller pupil and a narrower palpebral aperture than¹⁰ the opposite eye. The case proved to be the result of an injury received during childhood, and the presence of a foreign body in the choroid could be demonstrated. The ptosis was traumatic, the myosis was due to posterior adhesions, and the iris decoloration was probably a siderosis bulbi, or caused from a low grade iridocyclitis. I can see no objection to classifying this as one of heterochromia of the iris, of secondary origin due to an old injury (foreign body with uveitis).

HEREDITY

Heredity as a cause for heterochromia iridis, has not received the same consideration from modern writers as from those of a generation ago. I am firmly convinced that there are many such congenital cases without sign of

development of a pathologic lesion. And one reason why more cases are not so classified is that the observer, indifferent to the causes of heredity, does not stress its influence, and also that too few of our patients (clinical patients especially) know enough of their ancestry.

The history of cases I and II from the same family (more fully described under the heading of sympathetic paralysis) where the paralysis and lighter iris were all on the same side, in a manner substantiates the fact that heredity does play an important part. If the paralysis was the cause for the iris decoloration it would be proper to consider it as *the disorder* inherited.

Galezowski¹¹, Bistis¹² and Scalinci⁶ report cases of sympathetic paralysis, where one or more children in a family had iris decolorations which were inherited. But we should bear in mind Priestley Smith's¹³ words that "heredity is not in any real sense a cause. It may account for the presence of a disorder in an individual or family, but it tells us nothing as to its origin. In some former generation there must have been a first departure from the normal."

Osborne¹⁴ as early as 1849, drew attention to the difference in color of the irides of a person (that is they were irregularly marked), who had fifteen brothers and five sisters who all possessed the same abnormality which was derived from the mother, whose three sisters and one brother had the same which were again derived from the mother's side. Gunn¹⁵ mentions similar cases and classifies them as "piebald iris."

It has been stated many times that in congenital heterochromia iridis the color of one eye is inherited from the father, while the color of the other is derived from the mother. In many instances this has been true, but the reverse is as often the case, and even eyes of an entirely different color to either parent have been observed. This contradictory observation however would not refute the hereditary theory of transmission, bearing in mind the principles of Mendel's Law.

The family reported by Gossage¹⁶ is the only recorded case beyond the second generation that I find mentioned. A detailed description and examination of the eye unfortunately is not given, altho the author states that "in this family heterochromia of the iris tended to appear when one eye, always the left, was grayish blue in color, with chestnut brown patches. Of the offsprings of the affected members of the family eight were affected and twenty-two free."

From a genetic point of view, Przibram's¹⁷ work on angora cats is interesting. He found that the union of an

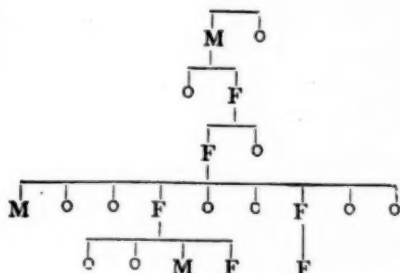


Fig. 1. Gossage's case. M, affected male; F, affected female; O, sex undetermined.

asymmetrically colored animal having one blue and one yellow eye, with a symmetrically colored animal having two blue or two yellow eyes, resulted in the production of both asymmetrically (heterochromia iridis) and symmetrically pigmented offsprings. He concluded that asymmetric animals can be traced back to asymmetric ancestry and that either color of an asymmetric parent can appear in the symmetric form of an offspring.

PARALYSIS OF THE CERVICAL SYMPATHETIC

Within the past few years attention has been directed to the association in heterochromic eyes of alteration of a paretic nature of the cervical sympathetic. In fact some observers, notably Bistis, are so enthusiastic over the close association that they have added to the classical Horner's Syndrome (ptosis, myosis, anhidrosis, hemiatrophy

facialis) heterochromia iridis as a symptom. Mayou¹⁸ in 1910 was probably the first to accurately describe these changes, although Horner (quoted by Samelsohn²⁰) as early as 1875 did draw attention to a case in which a light iris occurred on the same side with a ptosis of sympathetic origin. In all only thirty-three cases have been reported, ten of which were complicated either with cataract or a slow uveitis.

The following authors reported: Galezowski¹¹, 2 cases, 1 complicated; Horner's case reported by Samelsohn²⁰; Dethleffsen²¹, 5 cases, 1 complicated; Lutz²², 13 cases, 3 complicated; Hutchinson², 1 case; Alexander and Lander³², 5 cases, 2 complicated; Bistis³⁹, 2 complicated cases; Mayou¹⁸, 3 cases and Scalinci⁶, 1 case.

From my own observation I can report four cases; the first two being of the same family with positive symptoms of a sympathetic paralysis. Case III gave less prominent symptoms, and case IV presented only slight evidences of any sympathetic disturbance. My reason for here reporting case V along with the others, is that we may assume that the heterochromia was due to certain trophic disturbances from a complete hemiplegia.

Properly it belongs under the acquired classification, if the history is correct.

Case I. Baby R., male, age ten months, seen September 30, 1908; parents first noticed a drooping of the upper lid and a lighter color of the right eye when only a few weeks old. The father and mother are blonde and have blue eyes. The mother of the patient has a paternal aunt whose right eye is of lighter color; her brother has a drooping right upper lid with a lighter colored iris on the same side. This brother has a son (case II) with the same abnormality on the right side. There is also another brother whose eyes are of the same color, and whose son has a drooping upper lid and light eye on the right side. This patient (baby R) was born normally and has been healthy. The parents have noticed that the child

did not perspire on the right side of his brow.

The examination showed on the right side a decided ptosis, small pupil, light blue iris, and a dryness of the skin. As well as I could detect without a dilated pupil (the parents refusing eye drops) the fundus was normal and there were no corneal deposits. In July, 1915, nearly seven years later I again examined the child. He had been well and healthy. The upper right lid still drooped, but not greatly, there was some suggestion of a facial atrophy on the same side, the pupil was still quite small compared to the left eye, yet it reacted well to light; the iris was blue, vision 20/20 and fundus was normal

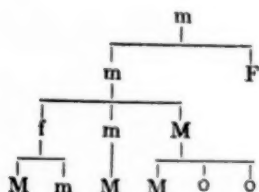


Fig. 2. Author's case. M, affected male; F, affected female; m, normal male; f, normal female; o, sex undetermined.

with no corneal deposits (without mydriasis). The left eye was normal and the iris brown. (Fig. 2.)

Case II. Master D, age 5. The family history is the same as case I, the patient being his first cousin. The maternal grandmother gave me the history of the family and patient, and she stated that the condition to be described existed from birth. The patient's father (uncle to case I) has blue eyes and the mother's eyes are hazel and I am told she is blind in one eye "from the rupture of a blood vessel." At birth there was some abnormality (a breech presentation) although no instruments were used. There are two younger children with normal eyes of the same color.

Examination: Right, drooping upper lid, facial hemiatrophy, palpebral fissure measured 5 mm., pupil active to light, 2 mm. in diameter. Color of iris was blue. Two drops of 1-1000 solution epinephrin did not dilate pupil. Cocain

not used. Fundus normal, no corneal deposits. Vision 20/20. Left, dark blue iris, with brownish pigmentation surrounding pupil, which measures 4 to 5 mm. Fundus normal. Vision 20/20.

The grandmother states when the child is unwell, the drooping of the upper lid and the narrowing of the pupil of the right eye are perceptibly increased. Perspires on left side of face only. (Fig. 2.)

Case III. J. L. M., male, age 57. States that all of his life the left eye has been smaller than the right and of a lighter color. Family history negative, all children have dark eyes. The patient was brought to me as a refractive case on account of headaches and dizziness. Patient is a brunette. Two years ago he had a stroke of apoplexy causing left hemiplegia, which now partially exists. He gives a positive luetic history, and has taken appropriate treatment including salvarsan.

Examination: Right 20/15 corrected. Palpebral aperture 12 mm. Iris brown; pupils active to light and measure 2.5 mm. Fundus shows many small vitreous opacities, but no corneal deposits. Typical retinal arteriosclerosis, i. e., beaded and corkscrew arteries. Pupil does not dilate to epinephrin, and sluggishly to cocain, as compared to left. Tonometer 20 mm. Left 20/20 corrected. Palpebral aperture 10 mm. Iris light grey and active to light. Pupil measures 3 mm., does not dilate to epinephrin, but actively and widely to cocain. Fundus no corneal deposits, but similar vitreous opacities and retinal changes as in right. Decided left facial hemiatrophy and apparent enophthalmos. No anhidrosis. Tonometer 20 mm., Hg. Visual fields contracted peripherally. Systolic blood pressure 172 mm. Hg.

Case IV. J. E. M., male, age 38. Family and hereditary history negative. Father's eyes brown, mother's blue. Patient is only member in family with differently colored irides and he states that he has had this difference all of his life. He consulted me for pain in eyes after reading.

Examination. Right eye comp. H.

astig. Vision 20/20. Pupil same size as left and reacted to light. Color of iris gray. Slight drooping of upper lid. Palpebral aperture 6 mm. Fundus normal. No corneal deposits.

Left eye. H. astig. Vision 20/20, pupil active to light. Color of iris brown. Palpebral aperture 8 mm. Decided bluish discoloration of sclera arranged in patches above and out, and down and out. After using the same number of drops of homatropin in each eye for an hour to dilate the pupils for retinoscopy, it was observed that the right (light iris) was dilated to maximum with loss of accommodation, whereas the left pupil still reacted to light, with little loss of accommodation. Prolonged use of the drops did produce cycloplegia. Seen one month later. Slight ptosis on the right side and right pupil 2.5 mm. whereas left 2 mm. No response to epinephrin and right pupil dilated to 4 mm. after twenty minutes use of one drop of cocain. Left did not dilate. The only additional evidence of a sympathetic paralysis was a slight ptosis on the lighter side.

Case V. P. R. R., male, age 43, consulted me on account of defective sight of long duration in the right eye. Several members of his family have bad eyes, evidently refractive errors and perhaps from ocular injuries. Blue or gray colored eyes predominate in the family. The patient is a decided brunette with black hair and states that when several months of age he was paralyzed on the entire left side of body and face. He states that the left eye has always been of lighter color than the right. The patient is a farmer of moderate intellect. A general physical and neurologic examination was made by Dr. H. Crenshaw, who reported nothing abnormal except a general left hemiplegia and there were no positive evidences of a sympathetic paralysis. The eye examination is as follows: Right, vision, light perception, extra-ocular muscles normal, pupil dilated and inactive, measures 5 mm. Iris light brown, with one area of intense brown pigment above and a sector shaped area of gray below. Media clear. Typi-

cal cupping with atrophic changes of glaucoma simplex. Tension 52 mm. Hg. Corneal anesthesia. Left, vision 20/30. Small pterygium. Pupil 2.5 mm., wide, active, iris gray, slightly shallow A. C., no drooping of upper lid. Fundus normal, cornea sensitive, no deposits. Field contracted peripherally with an encroachment on nasal side. No enlargement of blind spot nor scotoma. There was no anhidrosis; but there existed a decided asymmetry to the face; the left side much sunken, with a deepening of facial furrows. We assumed that the facial atrophy was due to the general hemiplegia and not to a seventh nerve involvement. It is difficult at this late day to explain in this case any direct connection between the light iris and facial hemiatrophy or hemiplegia on the left side, unless we can imagine that in infancy certain trophic disturbances developed as a result of the hemiplegia, but even this gives nothing very definite.

In closely reviewing the thirty-three cases reported it is very noticeable that in a good percentage the only evidence of a sympathetic alteration was a narrowing of the pupil in the lighter eye. While this is evidence of a sympathetic paralysis, it is not altogether positive. In case III which I believe to be of sympathetic paralysis (having ptosis and facial hemiatrophy), the pupil was larger and dilated under cocain more readily than its fellow. I take for granted that the authors have eliminated the many other influences which would cause a small pupil, before positively declaring the case as one of sympathetic disturbance. In this connection it is interesting to note Pollock's²³ well known experiment in which he caused a dilation of the pupil from a mydriatic and a contraction by direct light in cases where he had completely excised the superior cervical sympathetic and the ciliary ganglia.

Pollock concluded after his experiments that "evidence is given that a motor plexus with nerve cells exist in the sphincter and in the dilatator pupillae of the rabbit's iris. This plexus lies between the individual cells of the muscles and contains fibers of extreme

tenuity. The plexus persists after separation of the iris from the central nervous system. It may, therefore, be regarded in the same nature as the plexus of Auerbach and Meissner in the intestines."

It should also be borne in mind that in rabbit experiments where the superior cervical sympathetic ganglion has been completely removed there is often a paradoxical dilation of the pupil. The phenomenon has been observed by Langendorff²⁴, where several days after the ganglion has been removed the pupil markedly dilates, and he explains it by vasomotor changes, i. e., dilatation of the iris vessels causes the pupil to contract, while a narrowing produces a dilatation of the pupil. This vasomotor change also takes place in the ear; at first an increased warmth, and then later a coldness.

Another fact to be noted from the reported cases of heterochromia iridis associated with undoubted sympathetic paralysis is that the paralysis was usually congenital or first noticed in early infancy; and the difference in the color of the irides developed at the natural time when changes take place in the color of the iris. In several cases (Mayou¹⁹) there was a history of forceps delivery, which was naturally supposed to be the cause of the paralysis.

However it is not difficult to find equally as many reports of a sympathetic paralysis from forceps delivery without iris decoloration (Reese²⁵ and Burrows²⁶) altho in many of these reports no reference is made to the color of the iris. This lack of depigmentation in light colored irides of blondes with an associated sympathetic paralysis can easily be explained. Mayou²⁷ has also mentioned cases of sympathetic paralysis without iris decoloration associated with cervical rib. Of all the reported cases of sympathetic paralysis developing in adult life Bistis²⁸ reports the only positive case where a change in the color of the iris subsequently developed; and the case is well worth reviewing.

Bistis' case. Female age 38. The mother showed differences in the color of the irides and the lighter eye showed

cataract in an advanced age. For two years the patient's sight had failed and the color of the right iris has changed. There was pain around the right eye, facial hemiatrophy with anhidrosis of same side that appeared at same time as heterochromia. Author had seen patient much before onset of trouble and the condition described did not then exist. The eye showed ptosis, enophthalmus, descemetitis, blue iris, pupil does not dilate as well to cocain as opposite side, no effect by epinephrin. Aqueous slightly turbid, tension subnormal and lens changes.

Metzner²⁹ reports Mendel's case in which there were certain suggestive peripheral depigmented changes in the iris.

A traumatic paralysis of the superior cervical ganglion or nerve in adult life is by no means an uncommon accident, and as yet no reports have been made of a subsequent iris decoloration. I personally have followed two such cases. I have also inquired of the older ophthalmic surgeons of large experience, who at one time advocated and practiced sympathectomy for glaucoma, and in no instance has there been noted any subsequent change in the color of the iris.

SUGGESTED ALLIED CAUSES.

It is noted that in case III there existed slight deafness, which from the history and examination suggests nerve impairment. I can offer no opinion from this limited experience as to whether there is any association between the auditory, ocular and sympathetic disturbances. Mendel³⁰ mentioned a similar change in one of his cases. It is well known that deafness is often present in albino cats (Beaumont³¹) and in two cats which had heterochromia iridum and deafness, Alexander and Lander³² studied the anatomy of the eyes and ears. They found an absence of pigment in the perilymphatic cells of the auditory organ, and on the other hand the mesodermal pigment was absent in the lighter iris.

These same authors called attention to the influence which certain gland like

structures at the posterior part of the ciliary body first described by Collins³³, might have in producing a depigmentation of the iris. According to Griffin³⁴ these glands control the amount of pigment in the eye, as shown by their absence in albino eyes and their imperfect development in feebly pigmented blue eyes. As plausible as this theory seems, the presence of these glands are nevertheless doubted by other able men, Alt³⁵ and Rutteman³⁶, who were not even able to find their lumen. Finnoff³⁷ finds these so called pigmented glands, but thinks that they are pigmented plugs; and while he admits that gland like bodies may be demonstrated, he considers the lumen an artefact produced by the process of hardening; and a section of such tissue would resemble a tubular-like gland cut cross-wise. Therefore with this apparent uncertainty, we could hardly accept at the present time the suggestion that the so called ciliary glands of Collins have any influence in causing heterochromia iridis.

EXPERIMENTAL WORK

In regard to the experimental work, which has been done on animals by dividing the sympathetic nerve, or excising the superior cervical ganglion, Angelucci³⁸ found that section of the ganglion produced trophic alterations of the eye; among them being a disappearance of the pigment of the iris, with an atrophy and depigmentation of the choroid, besides certain well defined alterations of the blood vessels of the iris. Bistis³⁹ produced similar changes in the iris, and in one case he was able to demonstrate a cloudiness of the aqueous, and find in sections deposits on the posterior surface of the cornea, which to his mind was highly suggestive of an inflammatory process. Later Metzner and Wolflin²⁰ added evidence that a sympathetic paralysis caused a distinct loss of pigment in the iris, and also recorded other changes which had previously been observed, such as epiphora, flattening of the cornea (Angelucci), changes in the motility of the nictitat-

ing membrane and hypotonia. This latter observation was to a certain extent agreed with in our experiments.

By more recent experiments on rabbits these same authors concluded that the superior sympathetic ganglion must have an independent tonus as regards the dilatation of the pupil, for if on one side division of the nerve was made below the ganglion, and on the opposite side the ganglion was extirpated, the pupil was smaller on the extirpated side. Their experiments also showed that the extirpation of the ganglion was never accompanied by a depigmentation of the iris, but that a resection of the nerve below the ganglion was followed by a decoloration of the iris. These last mentioned experiments present new phases to the subject with which we have had no experience, and which are quite contrary to the generally accepted physiology of the sympathetic system.

In this connection it is of interest to know that Galezowski reported a case of heterochromia where in the lighter eye, the pupil and the palpebral fissure were wider and the eye was more prominent than its fellow. Obviously there were symptoms of a sympathetic stimulation or irritation.

THE AUTHOR'S EXPERIMENTS

An excision of the cervical sympathetic ganglion was made in the rabbit.

Guinea pigs were first employed in our experiments, mainly to perfect the operative technic of the removal of the superior cervical ganglion, and later Belgian hares were used. After the operation the ganglion was preserved in normal saline solution, later stained with methylene blue (vital stain) and examined microscopically.

Light ether anesthesia was administered, the fur on the under surface of the neck was shaved, the part washed with soap and water, sponged with alcohol and then painted with tincture of iodine. The ganglion was rapidly exposed and grasped with a pair of tissue forceps and excised with scissors. The skin incision was closed with continuous silk sutures and a sterile

gauze dressing applied with adhesive tape. Apparently the animals did not suffer in any way from the operation and were quite alert shortly afterwards. There were no infections.

As the rabbit's pupil is often oval (the vertical diameter being the greatest) pupillary measurements were made with a millimeter rule along the horizontal meridian of the cornea, that is from canthus to canthus. The eyes were exposed to daylight from a northerly direction. Tonometric readings were made with the Schiotz instrument and it was applied the moment after an instillation of one drop of a 4 per cent aqueous solution of cocaine. The lids were gently retracted with the fingers, and usually the readings were easily and presumably accurately made; although at times the animals were exceedingly nervous and frightened which apparently accounted for the wide variations in the intraocular tension.

The 7.5 milligram weight was employed, but when there was doubt of the accuracy, other weights were used as controls and the readings usually corresponded.

It was exceedingly difficult to distinguish early decoloration of the irides, and it is possible that one's imagination had its influence in causing certain discrepancies made in our early observations, but when a decided change was noted, this opinion was concurred in by three or four other observers. Eyes which showed no great change in the color during life presented a marked difference after enucleations and when held side by side for a closer comparison.

Five guinea pigs were used, and the four that survived, all showed a narrowing of the palpebral aperture and myosis, but no microscopic change in the color of the iris on the operative side even seven months after the operation. Weeping of the eye on the operative side was noticed as a symptom in three cases after recovery from ether anesthesia and later disappeared. The detailed account of these experiments is published in the Transactions of the

American Ophthalmological Society v. 16, p. 291-298.

TABLE 1.

Tonometric readings of the right eye before and after operation:

Rabbit No. 1—Average tension before operation, 22 mm. hg.; total average after, 24 mm. hg.

Rabbit No. 3—Average tension before operation, 27 mm. hg.; total average after, 22 mm. hg.

Rabbit No. 4—Average tension before operation, 26 mm. hg.; total average after, 21 mm. hg.

Rabbit No. 5—Average tension before operation, 25 mm. hg.; total average after, 14.8 mm. hg.

Rabbit No. 6—Average tension before operation, 27.3 mm. hg.; total average after, 22 mm. hg.

Rabbit No. 7—Average tension before operation, 21 mm. hg.; total average after, 12.1 mm. hg.

Rabbit No. 8—Average tension before operation, 7 mm. hg.; total average after, 17.8 mm. hg.

Rabbit No. 9—Average tension before operation, 16 mm. hg.; total average after, 14.3 mm. hg.

General average tension before operation, 21.5 mm. hg.; after operation, 18.5 mm. hg.

A summary of the above experiments on the nine rabbits, after a complete excision of the right superior cervical sympathetic ganglion shows:

1. No marked influence on lachrimation. There was an increase in one case immediately after operation.

2. The nictitating membrane was not affected by the operation.

3. A paresis of Müller's muscle, which caused drooping of the upper lid in all cases on the operated side.

4. The average horizontal diameter of the pupil before operation was 7.6 mm. It contracted immediately after the operation, and usually so remained, the average diameter then being 6 mm. In those cases where epinephrin was instilled into the conjunctival sac, it caused a dilatation of the pupil on the operated side.

5. There was no appreciable ophthalmoscopic change in the retina and

choroid. In rabbit No. 4, as seen from the notes, there were certain interesting developments in the iris which I was not able to explain. The tags of pigment undoubtedly developed from the epithelial layer, but what influence the operation had in causing them is a matter of conjecture. While I could not detect deposits on the posterior surface of the cornea a cloudiness of the aqueous was surely present at one time; also there were opacities in the media, which I placed in the posterior part of the lens, as the rabbit's lens is very thick. These opacities later disappeared.

6. There was an appreciable gross change in the color of the iris on the operated side in all cases except one; rabbit No. 3 died 24 days after operation. The longer the animal lived usually the more distinct was this discoloration; and where the eyes were enucleated and placed side by side for closer comparison the change was more decided. About five weeks after operation, changes in the color of the iris were first detected, altho in one case (rabbit No. 8) a suspected change took place in fifteen days, which was more positive during the fifth week. Unquestionable variations in the color of the iris were noted in rabbit No. 4. That is to say, at one time the change was barely perceptible, and at other times the decoloration was decided.

7. The intraocular tension (see chart and table), shows varying estimates, without any uniformity. Taking an average first reading before operation, the right eye was 21.5 mm. Hg., and left 22 mm. Hg. A combined average of all readings after operation (omitting the first reading), on the right was 18.5 mm. Hg., and the average of all readings on the left was 21.2 mm. Hg. This observation would lead us to believe that the removal of the superior cervical sympathetic ganglion lowers the intraocular tension in the eye on the operated side.

8. The age or weight of the animal apparently had no influence in these experiments.

CASES COMPLICATED BY CATARACT OR UVEITIS.

There is another classification of primary heterochromia iridis to be considered, namely those cases in which there is an uveal affection, evidenced by deposits on the posterior surface of the cornea, which may and usually does terminate in cataract. These complicated cases may or may not be associated with the apparent disturbances of the sympathetic. Of the thirty-three cases of iris decoloration associated with sympathetic paralysis, ten cases were complicated with uveitis or cataract.

Lawrence and Hutchinson were among the first to describe the association of cataract with heterochromia iridis, and Fuchs⁴¹ claims priority for first calling attention to the fact that chronic cyclitis with deposits occurred in the lighter eye. He also called attention to the fact that in his series of thirty-eight cases, twenty occurred within the first three decades, nine in the fourth decade, and the remaining number scattered. It was his opinion that heterochromia was usually due to some anatomic difference in the stroma of the iris, and when the retinal layer was affected, [which condition he had observed], it was then due to a chronic inflammation. He often noted that the pupil was larger on the lighter side.

Butler⁸ regards the cause as unknown, but when associated with a sympathetic paralysis, the chronic cyclitis may be comparable to the iritis and iridocyclitis which are occasionally seen in herpes ophthalmia, and are usually regarded as trophic disturbances. The same author also describes a train of symptoms which in part are as follows:

The change in the color of the iris may last several years before other complications set in, but sooner or later the patient complains of bad sight in the blue eye. There is never pain or redness, possibly a ciliary blush. There is no associated dyscrasia, altho patients look "out of sorts." Occasionally there is a transient albuminuria.

The eye shows fine keratitis punctata, which soon covers the whole posterior surface of the cornea, altho in other cases it is arranged sector shape. An exudation may develop in the vitreous, followed by opacities of the lens, which are often punctate, and glaucoma is not an infrequent complication. Choroiditis and optic neuritis have been observed. The prognosis is bad. The disease usually begins in youth, and is slow and may extend over a period of years or even decades.

Contrary to the views of Butler, and other observers, Galezowski is of the opinion that the depigmentation is preceded by a chronic inflammatory condition. On the other hand, Malgat regards the heterochromia as due to a difference in the blood circulating in the iris or ciliary body and from a lack of nourishment to the lens, a cataract being the natural consequence. Hirschberg is of this same opinion, but thinks that the defective circulation starts *en embryo* or before the development of the iris pigment. This condition may remain stationary for years, to again become active and cause a uveitis and cataract. Gunn refers to the iris which contains sectors of different colors, and which subsequently regains its color, and he thinks that it is suggestive of an abnormal innervation. Finally Dor⁴³ thinks that besides the congenital heterochromia (he does not mention sympathetic paralysis), there exists a disease of the eye yet unknown, which begins in heterochromia and ends in cataract.

It is natural to ascribe the formation of cataract in these cases directly to the absence of iris pigment, and also to the influence of the action of ordinary daylight. But Sym has drawn our attention to the fact that albinos are no more liable to cataracts in proportion to their number than are the normally pigmented.

Others attribute the cataracts to the chronic cyclitic which frequently accompanies heterochromia; and as certain other intraocular changes are frequently noted, and as occasionally serious complications follow extractions, it is a commonly accepted cause.

Scalinci regards the cataract as due to changed physiochemic relations with the circulating nutritive fluids or to biologic alterations in the content of the nutritive fluid itself, due to vasomotor paralysis.

Knapp, discussing Ellett's⁴⁶ paper on "Heterochromia Iridis, Heterochromic Cyclitis, etc.," was of the opinion that disturbances of the sympathetic system had very little to do in producing these changes (cyclitis). In practically all of his cases, the patients have reacted to the tuberculin test, and in a large number they have done well with tuberculin therapy.

But few writers have attempted to explain the alterations in the iris associated with a sympathetic paralysis; or in other words how a sympathetic paralysis caused an iris decoloration. The investigation of Angelucci on rabbits and dogs offers us a reasonable explanation. He concluded that the eye represents trophic disturbances on account of the influence which the cervical sympathetic exerts on the movements of the walls of the blood vessels (vasomotor effect). It is well known that for a time after the superior sympathetic has been excised, that there is a dilatation of the blood vessels, which in the case of the rabbit can easily be demonstrated in the ears. Later it is followed by a thickening of the vessel wall which tends to contract the lumen. With the weakening of the nutritive changes thus brought about, there is an arrest of development of the eye, and in the case of the iris, there is a more or less pronounced degree of simple atrophy, with its accompanying decoloration.

I cannot find recorded a report of a microscopic examination of a human decolorated iris associated with sympathetic paralysis. Bistis, in his examination of rabbit eyes, found a great reduction in the pigment and a thickening of the vessel wall. The pigment in the anterior layer is much reduced and appeared in small aggregations. The iris stroma possessed no pigment cells, but contained a large number of nuclei which occupy the

place of the stroma cells. These nuclei are round or oval and are situated in a basement substance composed of fibrillary connective tissue. He was also able to detect deposits in the posterior surface of the cornea. These findings, together with a cloudiness of the aqueous and the vessel wall changes, he thinks, are suggestive of an inflammatory condition.

Fuchs was the first to examine a heterochromic iris, occurring in cataracts. In one case he could demonstrate cells on the back of the cornea. There was some depigmentation in the anterior layer, principally of small pigment granules. In the deeper layer there were only isolated remains of the branching pigment stroma cells and these had lost their shape and had become round. These should not be confounded with clump cells found near the sphincter and Bruch's membrane. The retinal pigment layer was normal. The texture of the stroma had entirely changed and the network of the branching stroma cells had been replaced by nucleated cells of a different character. There was no accumulation of nuclei around the blood vessels as is seen in an inflammatory infiltration of the iris. Protoplasm is scanty and occurs around the nucleus like a seal ring. Lymphocytes were only occasionally found and no polynuclear leucocytes were seen. The blood vessels showed a hyaline degeneration; the nuclei were scarce, as were the endothelial nuclei. Complete closure of the lumen was observed.

Lagleyze⁴⁵ confirmed Fuchs' observations except there was greater atrophy and more depigmentation in the anterior layers.

AUTHOR'S FINDINGS.

Rabbit No. 1. Interval of eleven weeks and two days between operation and death. The notes show that after enucleation the right iris was "distinctly lighter" than the left, altho a suggestion of decoloration was noted some time before death. Microscopic study of each eye did not show any decided variation from the normal, except in a few of the thinnest sections there

was noted an appreciable difference in the general pigmentation in the extreme anterior border layer.

Rabbit No. 5. Interval of five weeks and four days between operation and death. After operation the right iris appeared lighter than the left, but no difference was detected microscopically.

Rabbit No. 8. Interval of approximately twenty-eight weeks between operation and death. There was noted before and after enucleation a decided difference in the pigmentation of the irides. Our findings did not differ materially from those of Bistis, Fuchs and Lagleyze. The greatest changes were noted in the anterior border layer, where there was a general atrophy of the branching pigment cells; this atrophy was likewise present to a large extent in the chromophores of the vessel layer. In certain areas along the margin of the anterior border layer, there appeared to be a disorganization or absorption of the pigment cells, which probably corresponded to the lighter areas seen on the iris during life. The pigment epithelium was unaffected, and there was no sign of inflammation. There was a difference in the thickening of the vessel walls, due to a hyaline degeneration, altho all of the iris vessels are characterized by a thickening of adventitia. We could not detect other marked vessel changes mentioned by other observers, which was probably due to the short interval between the operation and enucleation in this particular animal, as compared to Fuchs' examination of the human heterochromic eye.

Rabbit No. 4. Interval of thirteen months and twelve days between the operation and death. Before operation there was a noticeable difference in the color of the irides. With the low magnification the general comparison of the sections showed a marked difference. In the section of the right eye there was a "washed out" appearance in the anterior border and vessel layer with a noticeable depigmentation of the cells surrounding the larger vessels. These changes were especially noted in the middle and upper thirds of the

iris, and to some extent in the ciliary region.

The sections did not reveal any cause for the changes detected during life (i. e., the iris tags and lens opacities (?) described in the notes).

With the higher magnification, the changes were similar to those described in rabbit No. 8, except for an increase in adventitia thickening.

ACQUIRED SECONDARY HETEROCHROMIA IRIDUM.

Cases of heterochromia iridum occurring secondary to some acquired intraocular state are common to all ophthalmologists of any experience. A severe iridocyclitis, foreign bodies (metal) in the globe, degenerative changes of myopia and chronic glaucoma are the common causes.

COMMENT.

Those who have studied the literature of heterochromia iridis, or even casually glance over the many reports and discussions which I have very briefly collected, must have been impressed with the vastness of the subject and the lack of unity of opinion of the many authors. I, therefore, with trepidation, hesitate to express an opinion, unless substantiated by facts, and unfortunately in this character of investigation, "cold," positive facts are very few. I shall then confine myself to a systematic arrangement of the cases and causes of heterochromia, and express my personal opinion only where experience warrants it. I do not feel, however, that the last word on heterochromia iridis has been written, yet we do know a great deal concerning it.

I firmly believe in the influence of heredity and with the subject under consideration, I am convinced that in a proportionate number of these cases certain tendencies are inherited which cause a difference in the color of the irides. This statement especially applies to the cases in which there is not even the suggestion of any alteration of the cervical sympathetic system. In this country, where our people are not

only a mixed hue, but of many nationalities, a proportion of our fairly numerous cases of heterochromia are not pathologic specimens, but simply "freaks" of nature.

Regarding the inheritance of sympathetic paralysis, I believe that its cause may be transmitted, and its manner of producing heterochromia is similar to any other form of congenital sympathetic paralysis, including those of traumatic origin (forceps deliveries). Assuming then this sympathetic disturbance in fetal life, it would not be difficult to explain the arrested development of the iris pigment on the involved side; and we could suppose the changes in those cases occurring in early life, where the iris pigment has developed. These changes can only be explained by nutritional disturbances of trophic origin—first a vasodilation, then a hyaline degeneration of the adventitia, and finally a contraction of the vessel lumen.

The great number of clinical reports show that the difference in the color of the irides to have taken place within the first few months or years of life when the pigment cells were young and apparently easily absorbed; on the other hand I have not found a record where a sympathetic paralysis in the adult produced by trauma or operation, ever caused iris depigmentation.

A chronic uveitis (deposits on the posterior corneal surface), is often recognized in association with heterochromia with or without an accompanying sympathetic paralysis. Many such cases may have escaped close observation. It is claimed that the lighter iris renders the eye liable to a chronic cyclitis, while others are equally sure that the cyclitis precedes the decoloration, in fact, produces it. In support of either opinion, we have no real proof.

From our clinical observation and experimental study the corneal deposits which often accompany the heterochromia should be regarded as a symptom of disease, and where a sympathetic paralysis is associated, it may properly be reckoned as the cause, pro-

ducing the passive hyperemia of the iris and ciliary body which Sym and Scalinci describe. Precipitates have been found on the posterior surface of the rabbit's cornea, and I have observed a turbid aqueous after an excision of the sympathetic ganglion, and if we could at will observe our clinical cases, I believe we would find similar changes at some time.

To my mind there is much to be said in favor of Scalinci's theoretic consideration of the cause for these precipitates and the formation of cataracts. He maintains that there are abnormal substances which percolate thru an abnormally pigmented iris and ciliary body, due to vasomotor paralysis. The normal aqueous does not contain albumin, but when the anterior chamber is emptied, that which is then formed contains it, and fibrin may be demonstrated. This rapidly formed fluid is regarded as a transudate from the superficially placed vessels in the ciliary body, rather than a secretion of the body itself, and it is produced by a lowering of the intraocular tension. This change may account for the cloudy aqueous and precipitates noted in rabbits and for the precipitates seen in man.

The following ocular changes have been produced experimentally: First a decoloration of the iris (Bistis, Metzner, et al.); secondly, a cloudiness of the aqueous (author); thirdly, the formation of corneal deposits (Bistis), and lastly, uncertain lens opacities. The experiments have not been continued long enough to note more decided lens changes, in fact it might take years for them to develop, far beyond the natural life of the rabbit.

This, however, does not explain the other type, in which there is no evidence of a sympathetic alteration, and yet clinically we have the same picture, namely heterochromia, precipitates, and finally cataract.

It is as Dor expressed an unknown disease. It may and usually does be-

gin in youth and have the train of symptoms described by Butler, but hardly as severe and usually without the severe complications. From the investigations of Fuchs and others it is not a true inflammatory type of disease, such as iritis or cyclitis, and its precipitates may be produced from the same type of passive congestion which takes place in sympathetic disturbances. The origin appears to be in the vessels themselves, a type of sclerosis with obliteration. Whether or not this vasomotor disturbance is of trophic origin due to a sympathetic alteration without external evidence, is only a suggestion which other investigators of more original thought might consider.

In regard to the formation of cataract, it also appears that its origin is especially due to a lack of nutrition or to changes in the aqueous.

Finally our investigations have led us to make the following conclusions:

(1) That the difference in the color of the irides should be called Heterochromia Iridis.

(2) That in a small number of cases it is inherited.

(3) That in all other cases it is a symptom of some abnormal ocular state.

(4) That in a large percentage of the cases, a paralysis of the cervical sympathetic is the responsible cause for this heterochromia through its trophic disturbances. This paralysis may be inherited.

(5) That besides a congenital heterochromia there is an eye disease of unknown origin which begins in heterochromia and ends in cataract.

In closing I wish to acknowledge my debt of gratitude to Dr. G. Bachman, professor of physiology in the medical school of Emory University, in whose department our experiments were conducted. His advice was valuable, and the abstracts which he made of the foreign journals greatly facilitated the preparation of this paper.

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SYMPATHETIC IRIDOCYCLITIS AND POSSIBLY RELATED PROCESSES IN OTHER PARTS OF THE BODY.

D. F. HARBRIDGE, M. D.

PHOENIX, ARIZONA.

This argument supports the idea that the essential causative agent of sympathetic ophthalmia may exist in the body outside of an injured eye, and be transmitted through the blood currents. Microorganisms entering the exciting eye through injury might become established elsewhere in the body. Submitted as a Candidate's Thesis to the American Ophthalmological Society.

It is a fact accepted by most observers that sympathetic iridocyclitis is dependent upon a chronic plastic uveitis of the first eye. Preceding the fibrinous inflammatory process, the capsule of the eyeball must have been opened; usually by trauma, occasionally by an ulcer, or by operation, such as for cataract or iridectomy. Certain cases, however, have been reported in which the so called typical findings were present, the capsule not having been opened, following certain intraocular growths.

In my opinion, these dogmatic statements should be regarded circumspectly, for the reason that, while the establishment of a sympathetic iridocyclitis may require the occurrence of these events, it must not be overlooked that they are only events in the process, for underlying there is an agent inaugurating these changes. The agent may be a toxin or bacteria, specific in nature, or of special affinity for uveal tissue.

Clinically, sympathetic iridocyclitis shows no characteristic features to differentiate it from so called idiopathic or nontraumatic iridocyclitis; that is, as regards involvement, cause, and end

results. Those of known origin, due, as for example, to focal infections, syphilitic, or tubercular invasion, are particularly difficult of discrimination. Histologically, there may be specific differences.

This contribution was suggested by a recent experience which recalled to my mind the only case of sympathetic iridocyclitis which has occurred in my own practice. I have, of course, observed several cases of so called sympathetic irritation. That is, certain evidences of irritation were present in the fellow eye, but prompt removal of the injured eye was immediately followed by a cessation of these signs. In view of what is about to be stated, it is extremely doubtful whether they would have actually developed into cases of true sympathetic iridocyclitis.

One frequently encounters instances where trivial injuries to one eye, such as a small particle of foreign material on the cornea, will entail considerable irritability in its fellow. May not the irritability in the fellow eye, following more serious injury, frequently partake largely of this character? Clinically we have no means of determining, def-

initely, beforehand, whether the sound eye will or will not develop a sympathetic iridocyclitis. If we wait for frank evidence, the pathologic changes are already established, and it is too late. On the assumption that an eye is dangerous to its fellow, we enucleate; likely we save many, but it does not seem logical to believe that had we not interfered surgically the sound eye would have inevitably been lost.

Comparing my earlier experience, to which I have alluded, with the following case history, I felt I had a more or less common ground in explanation of the two conditions. I was deluded enough to feel that, in a measure, they were original. They were original theories to me, and yet, upon more complete examination of the literature, they seem "strangely familiar."

A man, aged 29 years, with a severe plastic iridocyclitis, had vision of fingers at three feet. Precipitates were present on Descemet's membrane, and the aqueous and vitreous were cloudy. The pupil was small, and atropin failed to tear loose all adhesions. Three years previously the patient had had a similar attack in the same eye. About the time the inflammation began to subside the left eye showed marked signs of involvement; lowered vision and interference with accommodative power, ciliary injection, precipitates on Descemet's membrane, etc.

His general health was excellent. Wassermann, complement fixation for gonorrhea, as well as tuberculin test, made by Dr. Watkins, in the Phoenix Laboratories, were negative. Searching further, two suspicious teeth were discovered, and radiographs showed apical abscesses. Removal of the teeth was followed within ten days by practically complete recovery. The iris of the right eye remained attached at three points.

Doubtless similar experiences have been observed by others, yet the history presents a feature which may merit emphasis. Clinically, at least, there are certain points of similarity between this history and that of sympathetic iridocyclitis. Pathologically, this similarity may not be so striking,

and yet it seems to me there are possibilities of something in common between the two conditions.

On January 25, 1912, T. R., colored, aged 56 years, was operated upon for cataract in the right eye. Two weeks later a dissection of the capsule was performed. Later he was discharged, with good pillars to the coloboma, and no incarceration of the iris. A convex spherical lens gave him a vision of 6/9. Four months later he returned, the eye sensitive to light, ciliary tenderness, slightly hazy cornea, $V=6/20$. In the fellow eye the lens was cataractous, the pupil small, ciliary injection and tenderness, precipitates on Descemet's membrane, and an infiltration of the iris obscuring its texture.

The attack came on suddenly, and rapidly developed into a severe plastic iridocyclitis. Active treatment was instituted, atropin, sweats, mercurials, large doses of salicylates, subconjunctival injections, salvarsan, and purgation. The condition continued in severity, with periods of more or less abatement of symptoms, until February 1, 1913, at which time he was discharged, with occlusion of the pupil. The eye was quiet, and remained so when last seen, April 19th, about fourteen months after the original operation. Vision in the operated eye remained 6/20, with a spherical +10 lens.

Considering this case in connection with my more recent experience, there are certain features which, at least, seem common to both. This patient had many decayed teeth, foul breath, and persistent constipation. At times he suffered severely with toothache. The question of a radiograph was not considered at that time. Doubtless certain infective foci would have been observed. In placing emphasis upon this point, I do so for the reason that very likely such cases are reported as being healthy, save for the eye inflammation.

Upon examining the case reports by many eminent observers, the statement is almost universally made that, "otherwise the patient is healthy." No statements are made regarding the condition of the teeth, tonsils, sinuses

prostate, or many other possible foci of infection, which in themselves may not be particularly disturbing, yet are of vital importance in the etiology of an inflammation in another part of the organism, whether it be a so called sympathetic iridocyclitis, a heart lesion, or a joint infection.

Reflecting upon my own experience, cases of true sympathetic iridocyclitis are of rather rare occurrence. I have observed some four hundred patients with injury to the eyeball, including perforating wounds of the globe, some due to cataract operations, others to iridectomies, but the greater majority due to injury by foreign bodies. In a percentage of this latter class the foreign body remained within the globe. Most of the injuries resulted from copper mine accidents, and those incident to the iron and steel industry. Not in a single instance have I observed another case of sympathetic iridocyclitis. In some of the cases, there was present some irritability in the fellow eye, but it entirely subsided with the quieting of the injured eye. In a small percentage the injured eye was severely damaged, and as a matter of safety the eye was removed.

Clinical and laboratory observations have been made evolving many familiar theories regarding transference of the inflammation from one eye to its fellow. It is more than probable that there are elements of truth in each theory, which, if we were able to fit them together, might offer a solution. While it is admitted that certain diseases have a specific cause, yet there are many affections which may have a variety of causes, or at least the source of infection, or agent, may come from one of several foci. The same focus of infection may be manifested in a variety of ways, in different tissues.

In any event, there are few which show onset, development, and cause precisely the same. They are modified by many conditions dependent upon individual characteristics and organism metabolism. Having these facts in mind, are we justified, in view of present knowledge, in believing that sym-

pathetic iridocyclitis is an entity, due to one specific cause? Rather should it not be considered more as a secondary disturbance, due to a local changed metabolism, the source of the agent being in the uveal tract of the injured eye, or perchance, in some other part of the body, a part of a symptom complex.

Possibly there may be a local focus of infection at the point of injury, but can it be successfully stated that this is always the case, and that this focus is always the cause of inflammation in the fellow eye? Injury of a tissue, particularly if there follows a low grade inflammatory process, leaves that tissue more susceptible to bacterial invasion, or toxic agents, the resistance having been lowered. It is, of course, conceivable that bacteria may enter the globe at the time of injury, remaining resident and more or less quiescent for an indefinite period.

It is likely true in a certain number of cases, but it is equally conceivable that injury to the uveal tissue prepares a fertile soil for bacterial invasion from other foci of infection. The resulting metabolic toxemia finds elements in the fellow eye for which it possesses a definite affinity, the severity of the attack being in accord with its virulence. This seems true, particularly in instances where long intervals are recorded between the time of injury and the onset of sympathetic iridocyclitis.

The fact that in certain cases even following enucleation, at more or less remote times, sympathetic iridocyclitis is established, seems to indicate at least that while we may grant the influence of the injured eye in possibly establishing a low grade inflammatory process, the continuance and increasing severity sometimes after enucleation are more than significant that the "fire" is being fed from another source. This may be from a small apical tooth abscess containing perhaps a strain of streptococci, with a special affinity for uveal tissue. The numerous relapses which sometimes occur during the course of the disease may be accounted for in the same way. The re-

port on sixty-five cases to the Ophthalmic Society of the United Kingdom is particularly impressive on this point. Sympathetic iridocyclitis followed from one to twenty-one years after enucleation. Snell observed one case one hundred and six days subsequently.

In this connection it is well to consider the possibility that, even if an eye has undergone an attack of sympathetic iridocyclitis with recovery, subsequent inflammatory relapses may be the result of entirely different causes, and in no way dependent upon the original inflammation, except in so far that an uveal inflammation renders the eye rather more subject to subsequent inflammation, the exciting cause being in no way related to the original cause.

It is recorded by certain observers, that sympathetic iridocyclitis is more liable to occur in children. I am not in a position to successfully question this, but when one considers the greater liability to industrial injuries of the middle aged male, it rather encourages an adverse view, unless we interpret this as meaning that in a given case a child's tissues are more susceptible to these inflammatory changes. Granting, however, that it is correct, this adds additional support to the theory that focal infection participates in this process, as children are especially susceptible to infections of the nasopharyngeal and oral cavities.

Crediting enucleation in a given case as the means of having saved the fellow eye, seems to me difficult to prove. We remove an eye, believing it to be a menace, yet, in anticipating this danger, we have no clinical or laboratory means of definitely knowing. If the inflammatory changes have once become established in the fellow eye, and the inflammatory process in the exciting eye not so severe as to anticipate complete destruction, and the sight previously serviceable not greatly reduced, such an eye should not be enucleated.

Of course, in the event of complete destruction, as a good surgical procedure it is wise to enucleate, but from my experience in observing three cases, in which sympathetic iridocyclitis was

already established in the fellow eye, removal of the exciting eye did not gain anything in particular in the amelioration of the inflammatory changes, nor prevent destruction of the sympathizing eye.

It is difficult to believe that the causative agent of sympathetic iridocyclitis is always resident in the injured eye alone, and that it is the sole etiologic factor to be considered in accounting for the changes in its fellow. If it were, how can those cases be explained in which useful vision is retained in the originally injured eye, and yet the sympathizing eye is lost. It seems reasonable to believe that, if the agent is virulent enough to destroy the sympathizing eye, surely it would produce a like result in the one originally involved, especially in view of the fact that its uveal tissue has already been damaged. Not only is the above reported case history illustrative of this point, but literature contains many similar instances.

These clinical observations are of interest in connection with certain histologic knowledge. Previous to the severity of an attack of sympathetic iridocyclitis more or less discrete granular elevations in the choroid have been observed. In destroyed eyes, which have been enucleated and examined microscopically the uveal tract shows isolated accumulations or elevated formations of proliferating epitheloid cells. The various stages of progression, and more or less isolation, of these nodular formations is strong evidence of their independent development, the agent being deposited at these several points at varying intervals.

If this is correct, the natural medium of transmission would be the blood current. The agent may be in part or wholly derived from the primary injured eye, yet, it seems good reasoning to believe, especially in view of the above clinical experience, that other foci of infection are not only contributing factors, but may be the essential source, by reason of the ease with which the blood stream can convey these agents from one part to another.

The intimate association of sympathetic iridocyclitis with the uveal tract, and the almost uniform accompanying penetrating wound of the eye capsule, arouses interest in contemplating the many perforating injuries to the globe which are never followed by any evidence of this malady. The vast majority of penetrating wounds heal and remain quiet, or at least they do not inaugurate inflammatory changes in the fellow eye. It is inconceivable to believe that they are all aseptic. Doubtless in many instances, likely the majority, the bacteria that find access to the parts are benign, or at least of such a strain as do not possess any special affinity for uveal tissue. If they were immediately virulent at the time of injury prompt destruction of the injured eye would ensue.

If the proper bacteria gain entrance at the time of injury, clinical evidence indicates that certain preparation must take place, as they do not become active for several weeks, and in some reported instances, years. This view is quite in accord with Rosenow's work. Certain strains of bacteria, especially streptococci, have a selective tissue affinity, or they are able to develop this affinity by growing in certain tissue, as, for example, injured uveal tissue.

It is quite in keeping with the clinical course of sympathetic iridocyclitis to say that streptococci, or, perchance, some other microorganism, infect the injured uveal tissue of one eye, at the time of injury or subsequently, from

some other body focus; and after a certain interval they develop an enhanced ability to attack and destroy similar tissue in the other eye. The time interval is just as much in favor of this as it is in favor of the development of tissue sensitiveness. In view of reported cases of sympathetic iridocyclitis in eyes with intraocular growths this seems especially adaptable as an explanation, the injured uveal tissue affording the necessary cultural media, the bacteria being supplied from some endogenous source.

The results obtained in the experimental work on anaphylaxis have all been on lower animals. The fact that sympathetic iridocyclitis is seen less frequently speaks against anaphylaxis. Surgical precautions would not affect the development of anaphylaxis in an injured eye, but would prevent bacterial destruction of tissues by removing the media suitable for bacterial growth. From the increasing number of eye injuries, and the decreasing occurrences of sympathetic iridocyclitis, possibly as a result of surgical interference, even when the globe is penetrated and tissues destroyed,—if it were anaphylaxis,—we would expect the number of cases to keep pace with the number of eye accidents, but they do not.

A fuller understanding of the nature of sympathetic iridocyclitis demands a more searching investigation for possible related processes in other parts of the body.

NOTES, CASES AND INSTRUMENTS

REPORT ON ONCHOCERCOSIS.

TACITO MOLINA IZQUIERDO.

GUATEMALA, C. A.

The ocular conditions associated with the so called coast erysipelas, which have been described by Pacheco Luna (Amer. Jour. Ophth., v. 1, p. 122), make the identification of the etiologic parasite a matter of interest to ophthalmologists.

During the month of July, 1917, I received from Dr. Pacheco Luna five tumors extirpated from two individuals attacked by so called coast erysipelas and named by him onchocercosis. These tumors had a form similar to that of the seed of a bean (*Vicia faba*, L.), and of equal size or somewhat larger than the same.

Dissecting the outer coat of Tumor A, I found that in the exterior existed a sclerosed tissue, extremely hard; and some nodules of the size and form of a pea which on being cut by a bistoury showed small threadlike fragments of ivory color that were very brittle.

In accord with Dr. Pacheco Luna, and following the method proposed by Brumpt (Precis de Parasitologie, 1913), I submitted the other four tumors to the action of artificial gastric juice, which transformed almost all the tissues of the tumors into a gelatinous matter, and I obtained the following results:

Tumor B. Pieces of the female which united measured about 40 cm. There were neither male nor embryos.

Tumor C. Fragments of the female with both extremities. The extremity of another female. Total of the fractions found, females 60 cm. Two males. Embryos very numerous.

Tumor D. Formed by several nodules. Nodule (a). Female, both ends and pieces of the body. One male of 24 mm. Embryos very numerous. Nodule (b). Extremity of female. One male of 35 mm. Embryos very numerous. Nodule (c). Fragments of the female without extremities. One male. Embryos very numerous. Nodule (d). Female extremities and body. Neither male nor embryos.

Tumor E. Female which with difficulty and patience I obtained entire. Length 32 cm. Neither male nor embryo.

OBSERVATIONS.

The female reaches more than 40 cm. in length by 300 μ , or somewhat larger—largest diameter. The striae are transverse, well marked. Submitting to hot water, the tumor C. previously treated by the artificial gastric juice, the skin remained separated like a sheath.

The male. The length up to 42 mm. Thickness (largest diameter) about 200 μ . Two spiculae which protrude almost from the same point, one from one of 180 μ , the other of 80 μ . The papillae difficult to be seen, the three anal orifices were identified. The tail is always curled up. In one of the tumors, which I examined after those already mentioned, and which also were sent to me, I found seven males and one female. In all I have examined thirteen males.

Embryos, length 250 μ , thickness largest diameter 10 μ , many even more. In the female with which there was no male, there were no embryos. I did not succeed in seeing any visible "spot."

Ova. I did not find any, but I had before me a preparation of Dr. Robles. They have the form of a lemon with a curled up embryo.

The work of microphotography I did, together with the medical student, V. M. Calderón. The preparations were, two from Dr. Robles, and the other my own.

The tumors have always been found under the hairy skin.

The infected zone of these filarias is in the Pacific region, Republic of Guatemala, between 1,000 and 2,000 feet above sea level.

The following comparative table clearly shows the characteristics of these filarias and their differences from other kinds.

COMPARATIVE TABLE.

| FILARIA BANCROFTI. Cobbold 1877 | ONCHOCERA VOLVULUS. Leuckart 1893 | SPECIMENS UNDER EXAMINATION |
|--|---|---|
| Body white opal-like Transparent | Body white opal-like Sufficiently transparent | Body white opal-like Little transparent (before preparing). |
| Integument smooth | Integument slightly striated transversely | Integument slightly striat- ed transversely. In the preparations striae are more marked. |
| Body thin Thinner at both ends, which are obtuse Mouth unarmed, without papillae Male: length 40 mm. Width 100μ Tail with tendency to curl in ring form Papillae 3 pairs, post- anal, none preanal Spiculae 2 thin unequal ones of 200μ and 600μ Anal opening 130μ from the end Female 8 to 10 cm. long Width 240 to 300μ Vulva 1 mm. to 1.30 mm. from the posterior end Anus 280μ from the pos- terior end Ova 40 by 23μ Ovovivipara | Body thin Thinner at both ends, which are obtuse Mouth unarmed, with- out papillae Male: length 30 mm. Width 130μ Tail curved and general- ly rolled up Papillae 3 at each side of anus, and 3 tail ones Spiculae 2 curved of 82μ and 117μ Anal opening 40μ from end Female 40 cm. long. (Prout) Width 360μ Vulva 760μ Anus? Ova large oval, with a prolongation, pointed at each pole. Vivipara | Body thin Thinner at both ends, which are obtuse Mouth unarmed, without papillae Male: length 42 mm. Width 200μ Tail always rolled up ring- like Papillae difficult to observe 2 curved unequal spiculae of 80μ and 180μ Anal opening 40μ ? Female 42 cm. long or more Width 300μ Vulva? Anus (Female)? Ova ovoid, lemon shaped with a prolongation on one of the poles. Vivipara (Molina) Ovovivipara (Robles) |

STEREOSCOPIC SILHOUETTES FOR TESTING ESTIMATION OF DISTANCES.

CAPT. HARRY VANDERBILT WÜRDEMANN.
SEATTLE, WASHINGTON.

These tests adapted, redrawn and translated by Dr. Würdemann were submitted for publication soon after the United States entered the war. It was deemed prudent to delay their publication at that time.

Some time ago there appeared by some foreign author whose name I do

not know and in what publication I am not cognizant, a description of a stereoscopic test for binocular vision and estimation of distances.

The plates were later republished and sold by Carl Zeiss of Jena. Photographic copies of these plates have recently been in use by the Examining Boards for Aviators of the Signal Corps of the United States Army. These were in the German language and as their use in this form for this particular purpose did not seem to me to be patriotic, therefore, I

appropriated the unknown author's ideas in toto as the spoils of war. I have redrawn the plates and have translated the lettering into the American language. It seems appropriate for this particular purpose that as the silhouettes were all of German objects that our American aviators will certainly see on the battle line at no distant period, the same objects be reproduced, and therefore, the plate here pictured and described is exactly the same so far as the drawing goes as that in

There is a slight variation in the picture to give a certain amount of stereoscopic perception of depth and aiding in the perception of distance.

No. 9 Gate in Lübeck, should seem the nearest, No. 1, Hohenzollern Castle next, then in the following order, 7 Holtenauer Lighthouse, 3 Cologne Cathedral, 2 Wartburg, 4 The Berlin Dome, 5 Lichtenstein Castle, 6 Zeppelin over Strassburg, 8 German Battleship "Kaiser Friedrich" and 10 which is the farthest away, German School Ship "Stein."

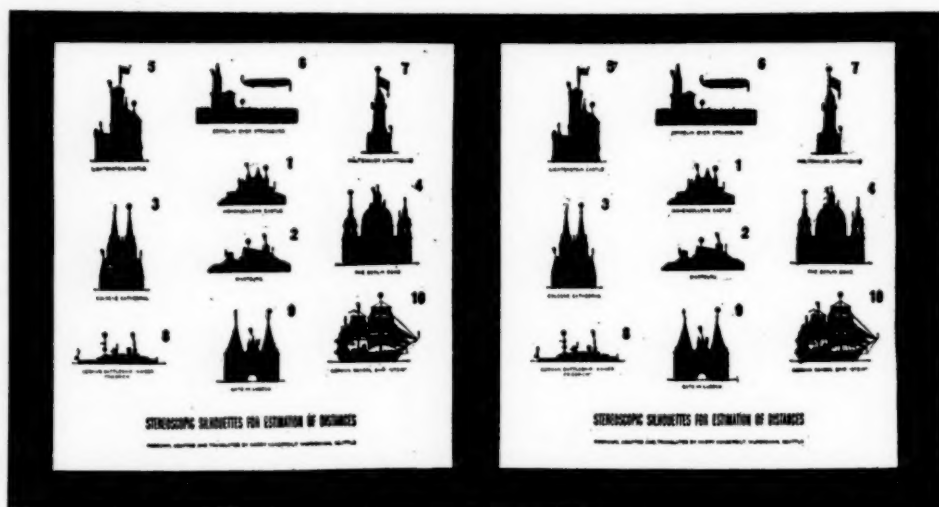


Fig. 1. Stereoscopic silhouettes for Testing Sense of Distance.

the German and thus I claim no originality whatever in this reproduction and essay.

I had the original enlarged five times by photography and redrew the pictures, substituted for the German legends their meaning in English and had it reduced to stereoscopic size by photo-engraving.

The difference between the lateral centers of each picture in the stereoscopic engraved reproduction varies according to the following:

The distances between numbers 9 and 9 are 66 mm.; between numbers 10 and 10, 68 mm. The objects numbered between these are $\frac{1}{5}$ mm. more or less apart. The scale reading 9 for the nearest, 1, 7, 3, 4, 5, 6, 8 and 10.

This is the most delicate test for binocular vision and for the perception of depth or distance. Any candidate for aviation who does not correctly answer these in the notation and rotation as above given has an imperfect perception of depth and distance and is not qualified for either a flyer or an observer. In civilian practice, the same condition holds good as when the numbers are properly stated there is evident perfect binocular vision. Persons with esophoria or exophoria beyond what may be esteemed the normal condition, i. e., not more than 5° esophoria or 3° exophoria for infinity or 6° exophoria for 30 cm. can not as a rule solve this chart as do those with perfect muscular balance.

GONOCOCCIC DACRYO-CYSTITIS.

DR. FRANCISCO M. FERNANDEZ.

HAVANA, CUBA.

The ocular complications of gonorrhea have been described by numerous authors, some a long time ago, some others very recently; and among these we have described several cases of metastatic conjunctivitis having that origin, and which is by far more common than the variety of ectogenous origin. (*Archiv. de Oftalm. Hispano-Amer. v. 17 p. 320.*)

On the other hand, the germs liable to produce dacryocystitis are first the streptococci and staphylococci, it having been stated by Wakisaka that the *Influenza Bacillus* and the *Pneumococcus* are also common. Less so are the *Bacillus Coli*, *Pyoceaneus*, *Friedlanders*, etc.; as well as some sarcinae, actinomicocydes, and other unclassified bacteria. But the presence of gonococci in the purulent secretion of a case of dacryocystitis is, although not extremely rare, of infrequent occurrence, it being due either to an ectogenous origin, or a metastatic one.

This observation refers to a curious case in which the lacrimal sac was surely invaded by the gonococci, without any involvement of the conjunctiva, the case occurring in a young man suffering from urethritis.

CASE X. X., a young man employed as clerk in a store, went into the Benéfica Hospital on the 2d of January, 1919, to receive treatment for his urethritis, and some days after was sent to our ward in order to have his right eye treated, as there was some pain and inflammation around the sac.

We saw the case and there was a typical dacryocystitis, with obstruction of the duct, and much tenderness and redness. After incising the abscess, the purulent secretion was sent to the laboratory. We received a report stating that the case was one of gonococcic origin.

We had a perfect drainage established for the escape of the secretion and after being sure of the cause of the disease, and ordering the best ways to combat it, the patient made an uneventful recovery and was sent back to the venereal ward after eight days, without any ocular complications.

THE FRIENDSHIP BETWEEN DONDERS AND VON GRAEFE.

DR. M. A. VAN HERWERDEN.

UTRECHT, HOLLAND.

This paper consists chiefly of personal letters preserved by Donders. It appeared in *Janus*, the International Journal of Medical History, the organ of the Dutch Historical Society of Medical Sciences, Twenty-second year, Parts five and six. Translated by Dr. William H. Crisp, Denver, Colorado.

"London seemed quite dead to me after you had left us, for in the first place there was no one from whom I had learned so much that was worth knowing as from you, and moreover my personal intercourse with you had been my very greatest pleasure. I know you too well to fear that you will receive this childishly frank confession of mine in bad part. You yourself must have observed from my entire behavior how inspiring and pleasing your personality was to me. To work with you or more correctly under your ægis

would be the fulfillment of a beautiful ideal; in zeal and love of truth at least I might be your equal, and the rest comes, as Shakespeare's Constable says, from God."

With these words the twenty-four year old Albrecht von Graefe reflected the impression which the young Dutch physiologist F. C. Donders had left with him during a joint stay in London in the year 1851. They form the beginning of an animated correspondence which took place between the two men of learning during the years 1852-1870.

In the Graefe Museum in Heidelberg is a collection of faded letters, witnesses to the warm feeling of friendship which for almost twenty years bound the famous Berlin ophthalmologist to our great Donders. We have Donders' personal act to thank for the fact that this correspondence has thus been preserved to posterity.¹

For the history of medicine this correspondence contains letters of great significance, which I hope to publish later. Regarded from the purely historical standpoint, the opening letter is the most important of the collection. The first experiments with the ophthalmoscope discovered by von Helmholtz in the previous year are described therein, and the instrument which, improved according to his own specification, was to open a new epoch for ophthalmology, is offered for Donders' use. The value of these letters from Graefe is not, however, purely scientific. They speak from one great mind to another, they awake by means of single sentences interwoven with a learned discussion such stirrings of the mind that not only the sympathetic personality of him who wrote them, but also the picture of the friend who received them, arises before our mind's eye.

Between the sixty-seven letters there are lacking those members of the series which would have linked them into an extremely valuable harmonious whole, namely Donders' replies. These have been found neither in the Graefe Museum nor in the possession of von Graefe's descendants. But no one who reads the Graefe letters can doubt that the beneficent, radiant warmth did not come merely from one side.

For Donders likewise the first companionship in London with the colleague ten years his junior was refreshing to heart and spirit. In an infirm-

ary where Donders attended clinics with the Viennese ophthalmologist von Jaeger, there burst in unexpectedly a young man in Alpine costume who threw himself into the arms of von Jaeger. With the words "You belong together," von Jaeger threw young von Graefe "literally into my arms," so relates Donders in the year 1886.² "And he had not deceived himself . . . von Graefe was my leader in the practical departments of knowledge in which I had wandered so little, and I on the other hand could furnish him with a number of details from the physiologic side. In this mutual completion there lay a great charm for us both. Those days, in which Graefe revealed all his amiableness of disposition, are among the most beautiful recollections of my life. When, after a few weeks, I left him, he had become as a younger brother whom I admired and loved."

"With great joy did I learn to know the goodhearted Jaeger from Vienna, and especially young Graefe from Berlin, who is not merely a good surgeon and ophthalmologist, but at the same time a meritorious physiologist and a lofty man. He will soon visit you," writes Donders a short time after his stay in London, to Jacob Moleschott, that other friend with whom he remains associated thru a long continued correspondence, this time up to his own death, because Moleschott outlived Donders, while von Graefe, as is known, died in the year 1870, when barely forty-two years old.

Some months after the first encounter, when Donders hopes to come to Berlin without the wish being fulfilled, von Graefe writes: "The idea of working and living in common with you here had become a regular impulse of my life, and in my thoughts I had already pictured in delightful colors our

1. "I should like to bring with me something for the Graefe museum . . . and in any case to arrange that after my death the letters addressed to me by von Graefe may find their place there," runs a letter from Donders to one of the members of the Ophthalmological Society.

Some of the Graefe letters contain remarks of Donders in his old age. How deeply he felt concerning them after the premature death of his friend is shown by a complete transcript which Donders left behind him. This transcript, committed to me for preparation some years ago, caused me to look up the original letters.

2. Address delivered to the Ophthalmological Society in Heidelberg on the 9th of August, 1886, on the occasion of the conferring of the Graefe medal on Helmholtz.

entire activity. Altho I might have been able to return only a feeble equivalent for the much which I thought to obtain from you, yet on the other hand I was certain that you would lack nothing that deepest friendship and most sincere respect afford. The sum total of my activities appears to me at times quite niggardly and wretched when I hear yours spoken of. While I perambulate in a relatively narrow circle of science and even there stumble all too often on unanswered questions, you wander with certain stride in the broadest and most beautiful fields of human knowledge and leave no spot without plucking some fruit. With such unequal gifts the only thing that I dare to presume to share with you is honesty of endeavor and the impulse to widen the boundaries of positive knowledge to the extent of my powers."

In every direction it was a period of exuberant growth in the lives of these young men of science. How necessary to keep one another informed not merely of the daily surprises in the scarcely explored fields of physiology and pathology, but at the same time concerning their deepest experiences! Along with the recollections of short meetings in Utrecht, in Berlin, Heidelberg or the Alps, with the longing to see one another again, there predominates the friendship of man for man. In relation to friendship, scientific interest—however important it may be and however large a part of the correspondence it may take up—occupies the background.

"Your letter came like a beautiful echo of bygone days and in the midst of our deafening everyday life again awakened their shining image before my soul," writes von Graefe after a visit of Donders to Berlin. "There is always, who could deny it, an element of melancholy sadness in this retrospective view of a happy past; but that is succeeded by a juster mood of pure delight, for the past truly belongs to us, the inviolable treasure of living memory. Only he who is unfaithful to himself loses also with himself the past. Thus will I gather to myself as an inalienable possession the days which were lived with Donders, and be grateful without complaining against my

fate. If you will leave me a place in your heart which perhaps I obtained without deserving it, I shall hope that past days were only the first chapter in a book of friendship whose story is without intrigue, but nevertheless and even on that account of the profoundest interest to those concerned."

In 1856, when von Graefe hopes to journey to Utrecht, he writes to Donders: "Do not be terrified by these words, because it really sounds as tho I would occupy your precious time with the whole of my inquisitive soul and fasten myself on your few hours of leisure with the whole weight of my questions. Believe much rather that along with the impulse to pump you dry there also lives in me so much respect for your physical and psychical welfare that my tormenting you will not be allowed to overstep a certain limit. It is, of course, sad for you to have to give up so much, but that is merely the disadvantage of the possessor in the democratic state of Science, to be held up by every needy fellow. So adapt yourself to your fate and from your friendship for me, precious and on my side undeserved as it is, derive resignation to tolerate the Berlin tormentor for an October week in Utrecht."

And in the year 1859, when von Graefe urges Donders to undertake an Alpine journey with him: "We really have much to exchange and aside from all ophthalmologic shop, it is after such a long separation only a natural need of the soul to influence one another again in more immediate fashion. I am quite aware that in this intellectual intercourse I am the recipient, and this even more than was formerly the case, since my strength has been broken by a number of adverse circumstances. But all that does not matter, one does not weigh and calculate, one follows one's inward attractions."

The feeling that, in relation to Donders' great figure, he was always the subordinate, the recipient in relation to the donor spirit, never left von Graefe even in later years, even at the time when his fame in broader circles exceeded that of Donders, and when pu-

pils and patients streamed to him from far and near.

"I brought nothing to Berlin but the burning wish to see you again soon, very soon, and with your two letters you succeeded in inflaming this desire," writes von Graefe a year later: "It is really an absolute intellectual necessity to me to be further associated with you." Your great saying: "To know is useful to us, but to learn is bliss," descends as a judgment upon my soul (*fällt mir mit Centnerlast auf die Seele*). How I feel with you in this,—but oh! poor I am destined "to know nothing right and to learn nothing more at all," while you surrender yourself to "the unspeakable delight" and by your learning continually bring knowledge to others. What remains for me . . . but to rejoice at your flight and with the fancy of friendship to occasionally imagine myself flying a little way with you!"

"I must see you soon in one way or another," we read eight years later. "Altho my life has really contained nothing special—with the exception of New Year's Day³—yet almost every day it seems to me as tho I had something to tell you. That is the true measure of mutual attachment, that we gather for each other, involuntarily—even tho mutely—the small blossoms which every day strews upon our path. But at times we must speak. Let us attend to this in our short life as far as in us lies." And again a year later: "Yes, those were truly beautiful days, beautiful hours when you slept under my roof . . . To create for ourselves as many noble joys as possible—is not that the only natural defence against the eternally recurring vexations of life? Vexation at circumstances, vexation at the human heart and at times also at one's own strength and worth—'Ergo bibamus,' 'Come soon, very soon!'"

"How incessantly I long to see you! Your few words concerning faithfulness strike like lightning into my heart or rather they sink therein like a ray of sunlight. One feels only too deeply, the farther life unfolds itself, that faithful mental communion is not an attri-

bute of human relationships, and that the proud joy of sharing heart and thought lovingly with one another, of serving and belonging to one another, languishes ignominiously beneath the parasitic exuberance of the ego. And the oases in the desert of this tendency lie so far apart and so scattered, that we can only attain them in fugitive moments. May heaven always preserve at least the thirst for them within us, for in this thirst, however little it may be quenched, lies the experience of that which we need in order to become real human beings."

After a visit of Helmholtz's, von Graefe writes to his Utrecht friend: "Helmholtz visited us in Berlin and greatly rejoiced us by his presence. He honors you quite as you deserve, and to me this was still another important point of attraction in the inventor of the ophthalmoscope."

But the great respect which speaks from the Graefe letters will never cloud his independent judgment, never restrain him from giving counsel in perfect frankness. When, in refutation of a German colleague, Donders sends a vehement essay to von Graefe for publication, the latter replies: "If I did not express my views concerning it, this would appear to me either forgetfulness of duty or cowardice; the former would be an injustice, the latter petty. The name of Donders stands too high with me to see him take an attitude toward S. which in the eyes of the uncomprehending multitude is interpreted as that of common polemics. He who as man and savant occupies such a place of honor does better to keep his hands clean of the filth which baser minds accumulate abundantly around them . . . so you will not be angry with me if I satisfied a necessity from which I could not detach myself because to me your person is so sacred that it worries me to see it in any way defiled through the perfidy of a baser mind."

In what spirit Donders' answer to this letter dated 21st November, 1853, was couched appears from the few

words written by him upon it with trembling hand when in his old age he read it through and revived its memories. "Splendid letter" we read there. It is thus very probable that Donders did not disregard the counsel of his youthful friend. Toward another friend it was Donders himself who at the same period was always the restraining, the deliberate counsellor. During this period he writes no letter to Moleschott without protesting against his vehement essays.³ From both correspondences may be learned in what frank and sincere relation these men, whose friendship was founded upon deep respect, stood to one another.

Until the year 1862 the correspondence with Donders is only interrupted by the exchange of visits, visits which, as already appears from the quotations, leave behind a treasure of memories. Even small raileries are not lacking after the Berlin visit. The preparation of a cysticercus has to be sent to Utrecht. "How is the poor little animal to reach his Utrecht home? Shall I risk sending him through the post carefully packed, or with my own hand commit him to your envoy, as something which exercises a decisive influence upon the weal and woe of mankind?" And in the next letter: "With this little sheet are despatched to you two copies of the Archives (*Arch. f. Ophthalmol.*) and also—woe is my orphaned desk—that beautiful decoration the cysticercus. May he go and prosper and bring luck to your house, and to your hand a blessing for very many, many children of men."

We can imagine how much Donders, always a welcome guest in the parental house of Graefe, sympathised with the friend who in deep mourning over the death of his mother wrote him the touching words: "In spite of all the help that had been called in from here and outside I saw what was dearest to me on this earth become paler and more lifeless from day to day, and on the twenty-second of November was obliged to kiss for the last time the

hands which since birth had heaped so many kindnesses upon me. In a short hour on a cold winter day I buried a long sunny season and now I wander about motherless before the closed door of my paternal house, impotent to conjure from the lifeless walls all the love which dwelt therein."

In the clinic and the workroom Graefe's earlier activity again revives. It is the time of the first glaucoma operations, that discovery thru which he shielded hundreds of contemporaries and millions of posterity from blindness. His leisure hours between his tense daily work, and also his vacations, were devoted to scientific investigation or to working up the wealth of clinical material, which from the year 1854 was described in a first ophthalmologic journal founded by himself (today well known as the most eminent in this field). It was the man of scarcely twenty-six years who brought this plan to realization. Already in the course of the first year, at his request Donders and the Viennese ophthalmologist von Arlt were added as associate editors.

In the year 1861, when after his betrothal to the Danish countess Knuth a sunny time promises to begin for von Graefe, and he joyously hopes for a speedy meeting with Donders in Heidelberg, there follows forthwith on the way to Heidelberg a serious illness in Baden-Baden, which for a while interrupts the correspondence. Donders personally visited his ailing friend. In touching words he himself gives a description of this visit: "Poor friend," said I, pressing his hand. "Yes, poor friend," replied he and added: "I occupied a whole hour in giving up all my illusions. But now I am all right again. Tell about Heidelberg." And when, moved by this "one hour", I did not immediately respond to his desire, he seized a book that lay by him, it was Goethe, and pointed me to the words whose deep meaning had so often struck us on Jaeger's test card: "One cannot too

3. On which day in 1868 von Graefe's only son was born.

4. For the correspondence between Donders and Moleschott see Janus, 1915, vol. 20, pp. 174, 409.

early experience how dispensable one is in the world."

At the end of June, 1862, the convalescent was for the first time in a position to write personally to his friend: "Yet how immeasurably great is the contrast between what after the long difficult time my heart holds for you and what my hand, at the present moment still weak, is able to accomplish . . . In the sunshine of recovery after a hard desperate illness, all good and noble impulses, which life alas so easily represses, spring up with original power out of the human heart; we feel the impotence of seeming possession and the value of real possession better than in healthier days. We are drawn to those in whose hearts we feel that we have a home."

And a short time later, when Donders has submitted to him his work on astigmatism: "Ought I to deny how proud I am over the dedication of Astigmatism? It is in the first place the honor which you have bestowed upon me, in that such an author has put my name on his title page, and then the joy which I derived from the contents of the work in which your creative and so happily organized mind instructs us in the most unmistakable fashion; but lastly it is the touching friendship and love which you express to me in the introductory words, through which so entirely after your own fashion you succeed in elevating me and spurring me on. On this occasion I again felt and knew how much more precious it is to be recognized and befriended by one whom we love and respect than to be praised by the multitude, even by our so-called colleagues.

"The true scientific sense, which has its roots in the thing itself and finds its starting point and objective in the striving for understanding, has been, we will freely confess, the portion of very few men; almost all of them snatch only at enrichment in honor and reward, and regard thru other and smaller eyes the things which did not originate with themselves. But for this reason the spirit attaches itself more firmly and intimately to the forms of those within whose bosoms a

higher impulse dwells and whose spiritual life has broken for them the road to higher spheres. Thus do you, my dear friend, prosper on in your sphere with vigorous wingbeats, and if it can cheer you to animate and impel others by your own motive power, be assured that I shall follow you unceasingly and always gather up gratefully the seeds which you scatter so generously and prodigally. Although I always have a longing to be in communication with you and to receive new impulses from you, at this moment this desire has reached its highest point. What have I not gone thru since you sat at my bed and read in my eyes that I believed myself to be taking a last farewell from you?"

In the summer of 1863, after a preliminary convalescence, von Graefe was married. Donders was a witness in Berlin of the first happy years of married life. Companion in joy and sorrow, he received the enraptured words of his friend concerning the first little daughter: "If you could only once see her, how friendly she looks around and how agreeably she comprehends life. It is true that these are studies and observations of perfect bliss which every feeling human being experiences in similar fashion, and yet each one surrenders himself to the illusion that he is illuminated by an altogether special ray of luck."

And when after a visit of Donders in Berlin in the year 1865 a little daughter dies, the touching plaint reaches him: "Our child is not dead . . . but hope is. The evening hour which you passed with us was the last gleam of light . . . Tears, only tears, still fall on the dear pale mouth. Commiserate with the friend in whose soul everything seems very dark and in his misfortune keep your thoughts true to him."

"The loss of my child came home to me terribly," writes von Graefe in the same year, "and the days in which one thread of hope after another was torn asunder were for myself a pitiful lingering death . . . If one is smitten by misfortune and cannot fully regain his equilibrium, neither is it given to us at such times to irradiate others har-

moniously; although we yearn for sympathy and help, we sink back continually into the gloomy key-note and shut ourselves up in ourselves. To this must be added that he who is sorely afflicted appears to himself as tho infected with a contagious disease; he also fears to infect and depress the soul that is healthy and erect, and the more so the closer he stands to him."

When a year later a new child is to occupy the empty place, von Graefe expresses the wish that Donders should come as godfather: "You had gone thru that terribly sad time with us and, with the true heart of a friend, had in such a way shared with us all our deep woe, that we thought you ought still to have a special association with the little newcomer who seemed destined to soften our grief." The thought of tying a bond between Donders and his children is awakened anew as the years approach when Graefe's tottering health renders probable an early end—a distinct indication how highly von Graefe placed the character of his friend, to whom after his death he wished to intrust the guidance of his son: "It would appear to me almost presumptuous to disturb you in your rest on account of this little citizen of the world. But you must allow us—in case you do not bring to life the incredible beauty of an actual visit—to register you as a witness and place you in closer and lasting relation with our little offspring. You must also promise me at once on this occasion in case I should not live to see it, to be a faithful counsellor to him in his studies . . . If you come, I should in any case take care that in the succeeding days you will be compensated, by something ophthalmologic of interest, for the insignificance of the little man who calls you hither.

Many a remark in the correspondence is also devoted to the family life in Utrecht, which von Graefe so often witnessed. After the receipt "of a charming photograph" of Donders' daughter in the year 1867, von Graefe

writes: "From your daughter's eyes your intellectual nature is so completely reflected. Shine on in full vigor, happy father! and joyfully drink into your own soul your youthful mirrored image! To beget life and from the created one to receive again new life, that is the blessed reciprocal arrangement of things in which the mortal feels himself immortal."

Scarcely three years later von Graefe, seriously ill, received the news of the death of Donders' only daughter⁵. Laboriously guiding his pen he wrote to his friend from the sick-bed: "This day on which I opened the unspeakably painful message will endure to me also as impenetrable night, for your happiness in your child was one of the best lamps of my life; so happily was it reflected over to myself when I saw your dear soul so completely filled by it . . . In vain I ask my wife to give me your letter once more. She sees how deeply I am suffering and refuses . . . Oh could I but convert your note into a feverish dream."

On the same day von Graefe writes in his last letter to Arlt in Vienna⁶: "What do you say to our Donders' frightful misfortune! . . . It is horrible, for he lived only in his Marie, on whom he focused in a certain measure his whole ego, not merely natural but also intellectual. To me also the news was a heavy blow. I was fairly convalescent, now I have only to think about it, how unhappy, how plunged into deepest night is the man whom I know and wish to know only as irradiated with sunshine—and I am sure of an attack of fever. If among those who are dearest to him one sees only misfortune after misfortune break out, one asks himself at last, where then does the motive lie so to love and foster life? But enough, my cerebrum still totters."

The same thought, that the man whom he had learned to know progressively as a shining hero in life must not be broken by suffering, predominates in the letter which von Graefe

5. Married in the year 1869 to Dr. Th. Engelmann, later professor at the University of Utrecht 1871-1897, and of Berlin 1897-1909.

6. Von Graefe's letters to Ferd. von Arlt are published in the *Wochenschrift für Therapie und Hygiene des Auges*, vols. 12 and 13.

writes to his friend eight days before death: "The slightest thought thereof (of Donders' suffering) called all too vividly to my memory from bygone time the chain of all your expressions of happiness, beginning with our last talk on the walk from Inselbad; I saw you before me radiant with that gleam of happiness which I had fancied I should never have to see extinguished in your features, I heard your words concerning the intellectual character and entire activity of her who belonged to you so closely, and I was too ill to remember with any calmness the present state of affairs . . .

Von Graefe's death in the year 1870 brought the correspondence to an end.

The friendship of twenty years duration between Donders and von Graefe, interrupted by no discordant note, led—by reason of its fruitful mutual influence—to consequences which extend far beyond the bounds of the individual existence of these two great men.

What a deep, far-reaching influence proceeded from Donders, that with the flight of years the friend who had the

world at his feet continued unchanged in his faithful reverence!

The man who as son-in-law was later to occupy such an important position in Donders' life, Dr. Th. Engelmann, also experienced the power of this influence when at his entrance into Holland, he wrote in the year 1867 to the Heidelberg anatomist Henle: "However great the leap from Germany to Holland, however radical the changes which one must allow to enter into his way of living, however unpleasantly above all the foreign language greets one at first, still even a nature which is little capable of adaptation must soon feel at home here if such good fortune falls to his lot as is that which intercourse with Donders affords. The spell which the personality of this man exerted upon me from the first moment, a spell whose beneficent fetters, as I perceive, will not easily fall away, causes me almost to forget that I am in a strange land."

Truly as a radiant figure did Donders in the broadest and most favorable sense dominate his environment.

SOCIETY PROCEEDINGS

COLLEGE OF PHYSICIANS OF PHILADELPHIA

February 5th, 1919

COL. WM. J. TAYLOR,

PRESIDENT

Concussion and Contusion Injuries of the Eye in Warfare.

Lt. Col. George E. de Schweinitz discussed some of the results of these injuries, and the pathogenetic problems which they present illustrating his paper by diagrams and water colors showing fundus lesions. This paper will be published in full in a subsequent number.

DISCUSSION: Captain George H. Cross: The markedly interesting pic-

ture presented in the ophthalmologic service in Hospital No. 11 at Cape May was the enormity of the hemorrhages or involvement of the fundus which masked temporarily the true condition. A long time after the injury there would be the appearance of a rupture but it was difficult to tell whether there was atrophy or rupture of the structures beneath. We had three cases of, so-called, "holes" in the macula, all due to injury of the skull and not directly to the eye.

We have at the present time another type of lesion in the case of a soldier with a piece of shrapnel about a centimeter square in the median line of the sphenoid, which penetrated straight in without injuring either eye

directly, but the visual fields are most unusually contracted. Externally the eyes are perfectly normal. In other cases the missile has struck the antrum injuring the orbital rim and floor. While the eyeball shows no external evidence of injury rare fundus conditions are found internally. In some cases the orbital rim and parts of the bony wall have been torn away but without injury to the eyeball itself, except displacing it from its normal position. Examination shows that there may be only light perception, with this peculiar condition of the fundus; in others a surprisingly large percentage of vision is retained. In one soldier the foreign body, while not injuring the globe directly, struck the rim of the orbit, traveling along the nasal side, finally landing in the orbital fat. The patient stated that when struck he became temporarily blind in both eyes; in three or four days he began to recover vision in the right eye, and when he arrived at Cape May the picture was that of a fine granular pigment in a triangular area below the disc, with no other evidence of injury. There was a perceptible diminution of vision in the field corresponding to the pigmented area noted in the fundus, but no scotoma was found, and no other pathologic condition.

Re-education of the Blind Soldiers.

Lieutenant Colonel James Bordley, Director, Red Cross Institute for the Blind, Baltimore, Md.: In an investigation of the wage earning pursuits of the civilian blind it was shown that the vast majority of the 85,000 blind in this country are dependent, in part or in whole, upon their friends, or the State; that in 100 cities 43 per cent. of the professional beggars are blind people; that the average wage of conscientious, willing, working blind men is about \$4 per week, and that of the same type of blind women is about half as much.

Blind people have a very definite economic value when properly trained. More money is wasted each year in foolish charity that would be required to train and place our whole blind pop-

ulation. Few people know that there is not a single school of the vocational training of the adult blind in the United States, that there never has been devised a scientific scheme for their education and training and that not a single normal school trains teachers for the blind. The medical profession is not altogether blameless for the mental deterioration of many blind people; thru mistaken sympathy the blind are kept in ignorance of their real condition. The attitude of the family is often a most serious drawback to their occupational development.

The attitude of the public is responsible for much of the trouble of blind people, and it was primarily to overcome this attitude that St. Dunstan's in England, and Evergreen in this country were opened. They are not schools in the narrow sense, but rather, universities where the blind are taught hope and courage, trades and professions, ambition and success. The men there are not "poor dear blind boys," but strong, resolute, normal men expecting to win. The courses of instruction at Evergreen are divided into recreational, essential handwork, and vocational.

The blind man has more difficulty learning to play than to work, and for this purpose music, dancing, bowling, swimming, gymnasium exercises are available as indoor activities, and field events as outdoor sports. Included in the essential handwork is typewriting. Another essential study is the raised dot type of the blind—Braille. The usual schemes for developing the sense of touch are taught. As occupations of profit there are taught bookbinding, telephone operating, massage and other industrial and commercial subjects.

Included in the commercial course is the application of an experimental store, the advance agent of a chain of stores to be operated by and in the interest of our blinded military men. The experimental store in size, color, shape and fixtures is the model that has been adopted for all the stores, and from this experimental store at Evergreen the

men will be transferred to our experimental stores in the business section of Baltimore. These stores are to be called "The Victory Stores," meaning the defeat of gloom, despair and affliction of the blind man himself. Our plan for teaching industrial work for the blind was evolved by our having an industrial engineer make a survey of industry and by a process of elimination it was readily discovered what jobs the blind could best fill.

Research Work on the Problems of Aviation.

Major Walter B. Lancaster, Boston: For the study of the problems of flight the visual function may be divided into the purely sensory or perceptive, the adjusting mechanism, and the psychic side of vision. Sensory functions withstand the strain of asphyxiation and fatigue without breakdown. Under this head are the retinal functions of light sense, color sense, form sense. The adjusting mechanisms are three: Fixation, focusing, adaptation to light. These are rather complex functions, and are likely to break down under strain; whether they will or not in a given case depends upon whether any defect is present, and on how well the defect is compensated, some defects being better compensated than others. To insure the best compensation the mental and physical conditions must be maintained at their best, hence the importance of the "care of the flier."

The psychic side of vision includes stereoscopic vision and various matters of judgment and discrimination based on visual perception. They are not much affected by asphyxiation and fatigue. Investigations are now being carried on regarding stereoscopic vision, and other methods of estimating distances at long range, as to light, sense and adaptation, as to accommodation speed, and as to the relative value of different ways of measuring heterophoria.

Major Meyer Wiener read a paper entitled *The Army School of Ophthalmology*, which will be published in full in this Journal.

ROYAL SOCIETY OF MEDICINE

Section of Ophthalmology

February 5th

MR. W. T. HOLMES SPICER, M.B.

President.

Retinal Changes Following Injury.

MR. A. C. HUDSON exhibited a case of retinal degeneration following the entry of an intraocular foreign body. The appearance seen was that of folds in the internal limiting membrane of the retina, as he took the location to be such. Some of the lines passed in front of certain retinal arteries; they also had a faint stippled appearance, both factors supporting his view that the seat was the internal limiting membrane of the retina. He did not regard them as folds in the retina itself. He thought they were pathologic.

The optic disc showed signs of having been edematous, and he thought there had been edema of the whole retina and optic disc. He had seen another instance in a case of retinitis pigmentosa, the folds in that case having occurred as a result of traction in the retina; likewise in a case of contusion of the whole macula. In this last case the retina appeared to be absent, except the portion which was represented by the double contour line. He regarded the lines as exactly analogous to the peculiar double lines to be often seen in the posterior capsule after cataract extraction; and to those seen in the cornea in striate keratitis following injury, again due to the folding of a thin elastic membrane, Descemet's.

DISCUSSION—MR. J. HERBERT FISHER said that supporting the idea that there was here a new formation, was the fact that the man was definitely blind in his remaining eye for a considerable time after he was hit. That suggested a definite lesion, probably in the fundus oculi; and as there was ecchymosis on the anterior part of the globe, probably the central edema was considerable.

MR. A. W. ORMOND thought the swelling was much greater in the upper than in the lower part of the disc, and he regarded it as pathologic.

Ivory Exostosis of Orbit.

MR. WILLIAM LANG and COLONEL DONALD ARMOUR showed a young man from whom Colonel Armour had removed an ivory exostosis of the orbit through the cranium. Colonel Armour said the surgical problem in this case was one of operative approach i. e., by what means the tumour could be reached and completely removed without doing damage to the cranial or orbital contents, and quite secondarily, to ensure that there should not be much disfigurement afterwards.

After seeing the skiagram, he concluded that the best approach would be through an osteoplastic flap turned over the frontal region, with its base at the supraorbital margin, turning down scalp and bone together. He did so, and that gave him a view of the cranial portion of the tumour, which was found to be indenting the under-surface of the frontal lobe. On pushing brain and dura gently back, he could see the whole extent of the cranial portion of the tumour. It at first appeared to be fixed to the supraorbital margin, but it was not so.

It was removed mainly by hammer and chisel, but the orbital roof portion was got away by means of cutting forceps, piecemeal. Complete recovery ensued; very little scarring remained, vision was normal, and there was neither diplopia nor fundus change. The tumour must have been growing from the frontal sinus. There was no evidence that the operator had broken into that sinus; he was looking out for such a contingency, from the point of view of possible sepsis, and also impediment to respiratory movements. On the day following the operation, however, and for a day or two succeeding, there was some escape of blood from the nostril. But the frontal sinus was evidently aseptic, as there was no further happening. The operator was congratulated by several speakers.

Tumor of Orbit.

MR. J. F. CUNNINGHAM showed a case of cartilaginous tumor of the roof of the orbit. Colonel Armour advised operation.

Angioma of Retina.

MR. ELMORE BREWERTON exhibited an instance of angioma of retina. The pathology was somewhat difficult, but he considered it a cavernous angioma. He gave his reasons for believing that the distension of veins was mechanical, and that the disease was in the lower oval swelling in the periphery. Such cases were practically never seen in old age. He regarded it as a congenital faulty development of the capillaries in that part of the retina, that these capillaries dilated into cavernous spaces, and there ensued an oval limited area of angioma. The prognosis in the case he did not regard as favourable; the vein would probably, sooner or later, begin to leak, indeed there was already slight exudation. The patient would probably have an intra-ocular hemorrhage, which might clear up, but a second one would result in the loss of his sight.

Mr. A. W. Ormond thought these cases were interesting on account of the other eye. A patient of his told him he had an eye removed at five years of age for a suspected growth. The condition was somewhat similar to what Coats described as massive exudation of the retina.

Hereditary Optic Atrophy.

DR. JAMES TAYLOR read a short communication on "Changes in the Sella Turcica in Association with Leber's Atrophy." The changes were very evident by the epidiascopic demonstration, especially in the posterior and anterior glenoid fossa. The paper seemed to confirm the thesis of Mr. Herbert Fisher, that these ocular and intracranial alterations were associated with definite sexual changes.

The President considered the paper an advance. Ogilvie's enquiry into the high infantile death-rate in families afflicted with Leber's atrophy seemed to point the way for further light.

Mr. J. Herbert Fisher reminded members that his contention was that Leber's optic atrophy was probably due to implication of visual pathways by the pituitary body, which at the time was undergoing excessive

changes, either in development or decline. He had since had a remarkable case in which all the symptoms came on in a woman aged 37 soon after her menopause at that age, and there also the sella turcica was definitely altered in comparison with the normal. If his thesis was correct, he did not know why separate, sporadic cases should not occur. Ogilvie's investigation seemed to make likely that the high infantile mortality might be due to syphilitic taint.

Fundus Drawings.

CAPTAIN W. WALLACE gave an interesting exhibition, by the epidiascope, of numerous drawings he had made of fundus changes resulting from war injuries. He offered his whole collection, which he had been working at for many years, to the profession, and Professor Herbert Parsons expressed the hope that they might be made the nucleus of an ophthalmologic atlas as a record of ophthalmologic work done during the war.

Sympathetic Ophthalmitis.

MR. FOSTER MOORE read a paper on a case of sympathetic ophthalmitis, with fundus changes. He said that sympathetic ophthalmitis was of rare occurrence during the war, therefore every case was worth recording. In this case, the fundus changes developed during the progress of the disease, and were visible throughout. The man had a penetrating wound of the right eye, and presented himself with a prolapse of the iris and ciliary body. The prolapse was removed on the seventh day after the wound and the eye was taken out a fortnight later.

The first sign of anything amiss with the left eye occurred 20 days after enucleation of the right, in the form of slight mistiness. Two days later, when Mr. Foster Moore saw him, there was slight tenderness on palpating the eye, and a fine deep haze was present in the lower part of the cornea. The fundus was normal, but there was some distention of veins. The appearance of the central part, around the stump of the optic nerve, caused the author to

suspect that uvea had been left behind; but it was found that the eye had been cleanly removed and there was no uveal pigment left.

Six weeks after the original wound there was a fresh crop of keratitis punctata spots. The blood count was normal. Skiagraphy did not reveal any foreign body; Wassermann was negative. There was a marked increase in the keratitis punctata, but later that disappeared, though it subsequently reappeared. Five doses of neosalvarsan were given.

The writer exhibited drawings showing the degree of keratitis punctata, which were made by Mr. Frank Juler. He did not think the mercury had any influence on the disease. That also was the view of a special committee of the Ophthalmological Society appointed to consider the subject of sympathetic ophthalmitis, for they said they did not consider that mercurial inunctions had any decidedly bad effect on sympathetic ophthalmitis.

H. DICKINSON.

OPHTHALMOLOGICAL SECTION BALTIMORE CITY MEDICAL SOCIETY

Meeting at Presbyterian Hospital
February 19, 1919

Operation for Closed Pupil.

Dr. Herbert Harlan exhibited a woman in whose case he used the De Wecker's scissors for operating upon a closed pupil following cataract extraction, with very good visual results. He stated that it was his experience that this method gave much better and more permanent results than any other which he had used.

Buphthalmos.

Dr. Harlan also exhibited a child with buphthalmos for which he performed an iridectomy. So far as he could see there had been no change in the eye since operation. He also reported a case of buphthalmos following interstitial keratitis, for which he had performed a cilio-optical neurotomy.

The eye appeared somewhat smaller although it had only been two weeks since the operation.

Operation for Strabismus.

Dr. Catlin presented a case of convergent strabismus which had been operated upon by the Briggs' tucking method. The results were very satisfactory.

In discussion Dr. Harlan stated that he was very well pleased with this method of operation.

Neuro-retinitis.

Dr. Fleming showed a case of neuro-retinitis, with star shaped exudate at the macula, in a young man of twenty-seven with visual acuity of 20/50; in whom all tests had been negative.

In discussion it was suggested that a provocative Wasserman be done, and a spinal puncture.

Pemphigus of Conjunctiva.

Dr. C. A. Clapp exhibited a case of extensive conjunctival degeneration with involvement of the cornea in a man of seventy, who gave a rather indefinite history of trouble with his eyes since fourteen years of age, with operation on the lids for entropion at that time. The right eye showed numerous bands across each fornix, with superficial vascularization of cornea and vision of 5/200. The left eye presented the same condition about the fornices, but with a dense white opacity of leather-like appearance over the cornea, which was exceedingly dry. In spite of numerous diagnoses of trachoma, he held that the case was one of pemphigus in the late stages, which did not exhibit the blisters that occurred in the early stages. Dr. Harlan confirmed his diagnosis.

Detachment of Retina.

Dr. Janney exhibited a case of bilateral detachment, in a young man of twenty, with negative Wassermann and other findings. In discussion it was suggested that he also have a provocative Wassermann.

No further business, meeting adjourned.

C. A. CLAPP, *Secretary.*

SECTION ON OPHTHALMOLOGY COLLEGE OF PHYSICIANS OF PHILADELPHIA

December 19, 1918

DR. S. LEWIS ZIEGLER,

Acting Chairman.

Metastatic Uveitis.

DR. CHARLES R. HEED detailed clinical notes of a case of bilateral metastatic infection of the uveal tract in a boy during the course of cerebrospinal meningitis, due to the meningococcus. The patient, aged ten years, complained of poor vision four days after the onset of the disease. First examination of eyes showed a marked yellowish exudate covering the pupillary space, with turbidity of aqueous, discolored irides and pupils fixed. Tension plus one, and vision reduced to light perception in each eye. The inflammation progressed for three days and then began to subside. On the eighth day the aqueous was clear, exudate less dense and vision, right eye, hand movements, left eye, counting fingers at eight inches. Improvement continued, and two months after first examination there was a very moderate circumcorneal injection, a few tags of posterior synechia and several dots on Descemet's membrane. The fundus reflex clearing showed a few vitreous opacities, the optic discs showing evidence of a previous neuritis, and far forward there were areas of a low-grade choroiditis. The unusual restoration of vision in this case is credited to four intraspinal injections of meningococcic serum.

Dr. William M. Sweet stated that he saw the case at the height of the inflammation. At that time the exudation in the right eye covered the pupillary area and a portion of the iris to the nasal side. In the left eye the exudation was less in amount. The light perception was poor in both eyes, and in the right eye was uncertain except in the upper outer quadrant. Dr. Sweet regarded the improvement in vision as remarkable in view of the amount of exudative inflammation.

A Case Showing a V-Shaped Iridotomy.

DR. S. LEWIS ZIEGLER exhibited a patient with membranous occlusion of the pupil in right eye, following post-operative infection of a complicated cataract. There was a history of iritis twenty-five years previous, with exclusion of pupil. When first seen the operated eye was still congested, but this was controlled by positive galvanism. On November 22, 1918, a V-shaped iridotomy was performed with the Ziegler knife-needle entering the corneoscleral junction above and making two long converging incisions in the iridocapsular membrane from below upward. The pupil opened up freely in the form of a triangle with base downward. Vision = 2/200. Refraction gave 20/70 with S + 11.D = C + 1.D Ax. 110° and J-12 with S + 3.D added. A faint opalescent reflex over the vitreous surface, exposed in the artificial pupil, suggests the possibility that an adventitious hyaloid membrane may be forming. If the suspicion proves correct this membrane will be incised in the hope of improving the vision.

On November 30, 1918, the cataract in the left eye was extracted, first inserting a modification of Kalt's suture in order to quickly close the globe and protect it against infection. Double-threaded needles were inserted, one in the sclera above the proposed incision and the other in the cornea just below it. A Graefe knife was passed between the threads, a large section of adherent iris was excised and the lens quickly removed. The lens was semitransparent but the nucleus was hard. The cortex did not escape freely, owing to its gluey character. The corneal suture was drawn taut and tied, thus making a firm self-supporting mattress suture. The field of operation was treated as an open wound with free irrigation and applications of ice pads. Altho some flakes of muco-pus were several times noted, there was no infection or other untoward symptom. There is considerable swollen cortical, but this is absorbing slowly. A second

dary capsulotomy will, of course, be required later.

Injury from Rat Poison.

Dr. McCluney Radcliffe reported a case of loss of eye, the result of an explosion of a tin of "Common Sense" rat poison.

While the patient was prying off the lid of the can it exploded with sufficient force to break her spectacle lens and cut a jagged wound in the cornea, the iris prolapsing.

The incarcerated iris was excised, and the wound closed.

The lens was cataractous, and finally panophthalmitis developed, necessitating enucleation of the eyeball. On section of the ball a wedged-shaped piece of glass, 8 mm. long, 3 mm. wide and 2 mm. thick, was found in the vitreous just back of the lens. The vitreous was filled with pus.

Conjunctival Scars from Inherited Lues.

Dr. J. Milton Griscom exhibited a girl, aged seven years, who had unusually well-marked facial and dental signs of congenital syphilis. She also had prominent areas of scar tissue on the conjunctival surface of both upper and lower lids. These resembled the scars seen after trachoma, but there were no signs of previous corneal involvement or evidence of distortion of the lids. Both parents were free from any evidence of trachoma, and it was considered that the conjunctival scars were the result of a prenatal syphilitic infection, with the probable formation of conjunctival gummata previous to birth.

DIVISION OF HEAD SURGERY.—(Office of the Surgeon-General, with Special Reference to Ophthalmology.)

Colonel Walter R. Parker presented by invitation a very interesting and instructive paper which will be published in full in this Journal.

DISCUSSION. Lieutenant-Colonel de Schweinitz, supplementing Colonel Parker's address on the activities of the Division of Surgery of the Head, and referring entirely to the Section

of Ophthalmology of the Medical Corps of the United States Army, spoke of the endeavor which had been constantly present to keep the ophthalmic personnel at a high standard of efficiency. To this end, in addition to the camp instruction to which Colonel Parker had referred, and the various addresses which had been made during camp inspections, the School of Ophthalmology in connection with United States General Hospital No. 14 at Fort Oglethorpe, was founded during the summer. It had been in contemplation for a long time, but the actual organization did not take place until July of the present year. This school had afforded the opportunity, because of the qualifying examinations which were necessary for entrance, as well as the qualifying examinations which were required at the end of a four weeks' intensive training course to remain in the ophthalmic work of the army, of greatly improving the selection of those men needed to fill the various ophthalmic positions. The abundant material used in teaching, as well as the carefully planned operative course and the cooperative work with the other departments of the hospital, for example, in neurology, urology, general medicine, oral and plastic surgery, had made it possible to develop a work which was the equivalent of any high-grade post-graduate ophthalmic course in the country and in point of fact, in many respects was superior to it. After the school had been fully organized it was placed in charge of Major Meyer Wiener, and he and his associates had done admirable work.

Colonel de Schweinitz briefly referred to the opportunities that had been his own to study the types and needs of war ophthalmic work in France during the fall and winter of 1917 and 1918, and the observations made there had been incorporated as much as possible in the work on this side of the water. He did not attempt

to describe the very complete organization of the ophthalmic work of the A. E. F., in charge of Lieutenant-Colonel Greenwood, ably assisted by Lieutenant-Colonels Black and Derby. Doubtless these officers would on their return make full description of their work. Colonel de Schweinitz paid a high tribute to the skill and effectiveness with which Colonel Parker had conducted his duties as Chief of the Division of Surgery of the Head in the Surgeon General's Office.

Fatty Degeneration of the Cornea.

Dr. Burton Chance exhibited a woman, aged sixty-eight years. The disease was first noticed about a year ago, altho no cause could be assigned for it by the patient. The area was elliptical in outline and occupied the lower hemisphere of the left cornea. The horizontal diameter was about 6 mm., the vertical 4 mm. The plaque was yellow and greatly resembled the appearance of highly polished old ivory. It lay beneath the epithelium and was quite distinctly demarcated from the healthy cornea. In the relation between it and the sound tissue it might have been likened to the lunule of the finger nail, but so distinctly did it appear that at a distance, so solid was it, it might have been mistaken for a dislocated calcareous lens in the anterior chamber. The epithelium at the center had become eroded by a stiff eyelash in the lower lid. This irritation had excited injection and had caused a fine leash of vessels to extend over the surface from the lower limbus. Elsewhere there were no blood vessels. There were no other signs of disease. The area had given rise to no symptoms other than blurred sight as the mass extended quite above the pupillary border.

It is likely that the disease arose from long continued irritation of the surface of the cornea by distorted eyelashes.

J. MILTON GRISCOM, M. D.,
Clerk.

ABSTRACTS

Raeder, G. Instrument for Measuring Depth of Anterior Chamber. (*Thalamometer.*) Norsk Magazine for Laegevidenskaben. 1918. p. 862.

Raeder in working to measure the depth of the anterior chamber with a binocular corneal microscope ascribes his varying results in the same patient at different examinations to the unconscious movement of the patient in the interval between the focusing of the instrument on the anterior surface of the cornea and the later focusing on the edge of the iris.

To overcome this difficulty he has constructed a single tube instrument by which the focusing on the two points (cornea and iris) is done *simultaneously*. This is accomplished by leading the rays from one-half of the field of the microscope thru a series of adjustable prisms allowing the images of the cornea and the iris to fall in the same perpendicular plane and thus to be seen by the observer's eye at the same time. The depth of the chamber is read off directly on a scale attached to one of the prisms. Accuracy up to 0.1 mm. is claimed. The surface of the cornea is brought into view by dusting it with finely powdered calomel or xeroform.

Since the anterior surface of the lens is difficult to observe, the edge of the pupil is used as the point of fixation.

Corrections are made for variations due to differences in the size of the pupil.

D. L. TILDERQUIST.

Frenkel, H. The Traumatic Syndrome of the Anterior Segment of the Eye. Ann. d' Ocul., Feb., 1918, v. 155, p. 78.) Frenkel describes 66 cases, of which 58 were war injuries, consisting of 7 shot, 40 shell, 3 grenade, 2 torpedo, 1 gun cap. The civil accidents were 2 splinters of wood, 1 piece of rock, 2 horse's foot, 2 fists, 2 falls and 2 whips. The following symptoms were found: Periocular lesion—7 supero-external orbital margin, 20 su-

pero-internal, 9 inferior, 1 zygomatic arch, 10 root of the nose, 1 ala of the nose, 1 ridge of the nose, 13 upper lid, 11 lower lid, 4 forehead, 5 cheek and face.

The *cornea* is always intact in this syndrome. In most recent cases there is hyphemia, the anterior chamber is deeper than normal, 31, some in toto, some in part; diminished in 22, some in toto, some in part.

The *iris* showed: (a) Rents; iridodialysis 23, perforation 29, rarefaction of tissue 8, rupture of the pupillary margin 1, dilatation of the pupillary margin 1, partial atrophy of the pupillary margin 1, notching of the pupillary margin 1, detachment of the iris 1, atrophy of the iris 1.

(b) Semicircular folding of the iris 8, 1 double.

(c) Trembling 23.

Pupil—Changes were: (a) Form—mydriasis 52, racket shaped 9, oval 16, round 5, deformed 14, festooned margin 5.

(b) Dislocation—21 cases in various directions.

(c) Reaction—Feeble 13, very feeble 8, abolished to light 22, to accommodation 21, partial below only 1, temporal side only, 1.

Dislocations of the Lens—(a) With rotation above and anteriorly 1.

(b) Anteroposteriorly, 12.

(c) Frontally, 25.

(d) Combination, 9.

(e) Not indicated, 19.

Cataract—(a) Stationary—anterior subcapsular, 35; posterior subcapsular, 5; perinuclear, 9; equatorial, 2.

(b) Progressive—Total, 2; intumescent, 2; operated, 3; spontaneously absorbed, 1.

Complications—Traumatic retinohoroiditis, 12; detachment of the retina, 5; vitreous opacities, 6; atrophy of nerve, 4; posterior, 5; increase of tension, 1, following anterior dislocation of the lens; strabismus, 5; facial paralysis, 1.

Diminution of visual acuity was an almost constant factor, independent of lesions of the posterior part of the eye. It was probably in great part due to dislocation of the lens. In 37 cases it was below $1/20$, in the remainder it ranged from $1/10$ to $8/10$. Refractive errors in the injured eye were M. 1, H. 6, H. Ast. 1. The accommodation showed nothing distinctive.

Altho some of the lesions found are due to indirect violence, those of the iris and lens are most probably due to direct action on the region of the zonula of Zinn, the force being applied obliquely. After the blood is absorbed from the anterior chamber, the state of the eye remains stationary, except for the development of an occasional cataract. Sight is always poor, even after cataract operation. Treatment consists in measures to promote the absorption, of the hyphemia, dionin, subconjunctival injections, cataract operation, and treatment of the periocular injury.

C. L.

A. Frias Oñate. Cocain in Ophthalmic Practice. Revista de Medicina y Cirugía de la Habana, Nov. 10, 1918.

The author mentions several cases of serious collapse from the use of 10 per cent solution of cocain. Frias thinks that the 3 and 4% solutions are not sufficient to produce anesthesia. The author believes that fresh solutions should be used every time, and he states that the collapse is probably not due to an emotion on the part of the patient, but to the fact that old solutions are used. Frias states that he uses in his ophthalmic operations a solution 20 per cent in strength, which (no doubt) gives him a perfect anesthesia. Nervous patients, old people and children, should put the eye surgeon on guard.

F. M. FERNANDEZ.

Rasquin, E. Charts for the Determination of Professional Visual Acuity and Vision for Military Service. (Ann. d' Ocul., Mar., 1918. v. 155, p. 117) defines the *minimum visible angle* as the smallest angle under which the luminous object is visible, and the *mini-*

mum sparable angle that which permits two neighboring points to be distinguished. The former is smaller than the latter and depends on the intensity of the illumination, while the latter depends on the elements of the retina and is equal to one minute. Based upon this, numerous well known test charts have been constructed. But for the purpose of estimating the loss of vision for work, for the estimation of damages and for the granting of pension, a chart is needed which shall fill two conditions: (1) It shall be composed of characters recognizable by all and constructed according to ophthalmologic principles; and (2) It shall furnish a uniform gradation appropriate to the requirements. The broken rings of Landolt adopted by the VI Int. Congress, at Naples, is theoretically correct and adapted to most cases, but in the case of unintelligent patients localization is sometimes very difficult, especially the oblique directions, e. g., 45%, etc.

For various reasons the author rejects other forms of test cards in use, and describes the ones he advocates. Starting with the assumption that visual acuity diminishes in arithmetic ratio while the visual angle increases in geometric, he has constructed three scales or charts, one composed of letters and figures (Snellen); one of E, but with all three bars of equal length, turned up, down, right or left; and one squares with a break in the upper or lower, right or left side. He prefers the first two in estimating the loss of capacity for work. The chart consists of 12 lines, the first 11 increasing by geometrical progression at a ratio of 1.2231, representing vision from 0.1 to 0.75, the 12th line is so constructed that the image is partly extra macular and indicates a vision of 0.05. The chart should be read at a distance of 5 M.

Below is given a scale for estimating, in general, the visual acuity, according to the chart. To determine the partial incapacity of the patient, count the number of lines between the upper and lower limits of acuity for his work which gives the denominator of a frac-

tion the numerator of which is the difference between that number and the position of the line which the patient can read below the upper limit for his work. For example, the patient has an occupation which requires an acuity of between $1/2$ and $1/20$. The scale shows 9 lines between the upper and lower limits. The professional acuity for this occupation is therefore divided into ninths. If he reads the third line which follows the upper limit he pos-

sesses $\frac{9-3}{6} = 6/9$ profession-acuity.

explosion; in 69 of these, one eye alone became blind and in 7 both eyes. Further, there were 31 contusions, among which were 12 scleral ruptures and 8 stab wounds, with unilateral blindness in 5 cases. Two hundred and fifty-four eyes were enucleated: 158 of these were bullet injuries, 59 shrapnel injuries, 31 explosion injuries, 4 scleral ruptures, and 4 stab wounds.

Salzman in Graz has not observed any sympathetic ophthalmia among those injured in the war. Uhthoff treated 252 direct injuries of the eye-

| Linear Dimension | | Distance at which line should be read | Physiologic visual acuity | Professional Visual Acuity | | | |
|------------------|-----------|---------------------------------------|---------------------------|----------------------------------|--------|------|-------|
| Letters | Parts | | | Professional visual requirements | | | "War" |
| | | | | High | Medium | Low | |
| 7.27 mm. | 1.46 mm. | 5.00 M. | 1 | 1 | 1 | 1 | 1 |
| 9.72 mm. | 1.94 mm. | 6.67 M. | 0.75 | 1 | 1 | 1 | 1 |
| 11.87 mm. | 2.37 mm. | 8.16 M. | 0.61 | 9/10 | 1 | 1 | 11/12 |
| 14.52 mm. | 2.90 mm. | 9.98 M. | 0.5 | 8/10 | 9/10 | 1 | 10/12 |
| 17.76 mm. | 3.55 mm. | 12.21 M. | 0.41 | 7/10 | 8/10 | 9/10 | 9/12 |
| 21.72 mm. | 4.34 mm. | 14.93 M. | 0.33 | 6/10 | 7/10 | 8/10 | 8/12 |
| 26.56 mm. | 5.31 mm. | 18.26 M. | 0.27 | 5/10 | 6/10 | 7/10 | 7/12 |
| 32.49 mm. | 6.50 mm. | 22.34 M. | 0.22 | 4/10 | 5/10 | 6/10 | 6/12 |
| 39.74 mm. | 7.95 mm. | 27.32 M. | 0.18 | 3/10 | 4/10 | 5/10 | 5/12 |
| 48.66 mm. | 9.71 mm. | 33.42 M. | 0.15 | 2/10 | 3/10 | 4/10 | 4/12 |
| 59.46 mm. | 11.89 mm. | 40.88 M. | 0.12 | 1/10 | 2/10 | 3/10 | 3/12 |
| 72.72 mm. | 14.54 mm. | 50.00 M. | 0.1 | 0 | 1/10 | 2/10 | 2/12 |
| 145.44 mm. | 29.08 mm. | 100.00 M. | 0.05 | 0 | 0 | 1/10 | 1/12 |

C. L.

Dimmer, War Injuries and Sympathetic Ophthalmia. *Klin. Monatsb. f. Augenheilk.*, v. 57, p. 257.

Sympathetic ophthalmia has certainly occurred only very rarely during the present war. In the clinical material of the Vienna University Eye Clinic, not one case had been noted up to July, 1916.

v. Grosz had not seen a single case of sympathetic ophthalmia during the first year of the war. The number of injuries included in his report is very large. He saw 406 injuries from rifle bullets, of which 145 cases became blind in one eye and 40 in both eyes. In 168 cases of shrapnel injuries, unilateral blindness resulted 121 times and bilateral blindness 15 times. One hundred and eighteen injuries were due to

ball, among wounded soldiers with total blindness in 48 percent of these eyes. Uhthoff saw no case of sympathetic ophthalmia. R. Oleynik in a report on eye injuries, makes the direct statement that no case of sympathetic ophthalmia had been observed.

Positive cases of sympathetic ophthalmia following injuries in the present war are reported by Birch-Hirschfeld, M. Sachs and Krusius. Birch-Hirschfeld reports an injury by a splinter of a bomb, 18 days before the case came to the hospital. The eye showed a mild iridocyclitis; few precipitates on Descemet's membrane; cataract; globe slightly tender to the touch; and movements visible directly in front of the eye. Enucleation was resorted to at once. Two days later, the fellow eye

showed typical signs of sympathetic disease. M. Sachs made an oral report of a case. The eye was enucleated late, and shortly after the enucleation, typical sympathetic disease appeared in the fellow eye. The statements of Krusius are too general to permit of any definite conclusions.

v. Grosz, Jessop and de Lapersonne refer to the great number of cases of sympathetic ophthalmia during the Franco-Prussian war, 1870-71. Grosz remarks, that this disease claimed many victims during the Franco-Prussian war as compared to the present war.

Dimmer noted the striking disproportion between the large number of cases of sympathetic ophthalmia during the Franco-Prussian war of 1870-71 and the very few cases observed in the present war; but could not convince himself, that this could be attributed to the better treatment of the eye injuries today. He questioned whether all the cases published in the war of 1870-71 were really sympathetic ophthalmia, and what was the character of the process in those cases which can be regarded with certainty as sympathetic ophthalmia.

In the Military Report of the German Army in the war with France, 1870-71 Dimmer found recorded 99 cases of sympathetic ophthalmia among the German wounded. After a careful study of the histories of these cases, he comes to the conclusion: that among the 99 recorded, not a single case of undoubted sympathetic ophthalmia can be found; and that the statements in the literature concerning the large number of sympathetic ophthalmias in the German army in the war of 1870 and the resulting great number of cases of blindness, should be rectified, since the reports at hand show, that altho sympathetic irritations were observed repeatedly, not one case of undoubted sympathetic ophthalmia could be ascertained.

Returning to the question of sympathetic ophthalmia in the present war, he repeats that this disease certainly occurs very rarely, and that this is by no means inconsistent with conditions

in the war of 1870-71, as shown by a study of the case histories. He urges that the question of sympathetic ophthalmia among the injured in the present war be studied more minutely with especial reference to the following points: The question of the sanitary measures, and the question of pathogenesis of sympathetic ophthalmia. Some of the results of the investigations will yield information in both directions. If, for instance, we determine the period of time between the injury and the enucleation, we are informed on the one hand, whether the injured were properly treated, and on the other hand, it will be of scientific interest, should it be shown that sympathetic ophthalmia was observed, altho rarely, notwithstanding the fact that the injured eyes in a large number of instances were removed in due time.

Reviewing the war injuries of his clinic, with reference to the time that had elapsed between the injury and the enucleation, he found the following: The total number of enucleations was 142, including cases enucleated elsewhere which came to the clinic for examination. Of these, 60 were gunshot injuries, 16 bombshell, 36 shrapnel, 3 stone splinter, 8 hoof kick, 5 stone cast, 3 bayonet stab, 1 cartridge, 1 explosion, 1 glass, 1 tree branch, 1 blow. In 11 of these cases the date of the injury could not be obtained, so that the interval between the injury and the enucleation was ascertained in 131. Of these 22 were enucleated within the first 2 weeks after injury; 46 cases, 2 to 4 weeks; 24 cases, 4 to 8 weeks; 20 cases, 6 to 8 weeks, and 19 cases still later than 8 weeks. This shows that in a very large number of cases (83.2 per cent), enucleation was resorted to later than absolute protection against sympathetic ophthalmia is to be expected.

Dimmer gives the following possible reasons for the rare occurrence of sympathetic ophthalmia among war injuries: 1. Enucleation is resorted to within a shorter space of time after the injury. 2. The healthy condition of the wounded soldier may make him less susceptible to the disease.

Schirmer has shown that sympathetic ophthalmia generally appears within the first year after the injury, and usually after the fourth week; most frequently between the sixth and the twelfth week after the injury. If it could be shown in a very large number of war injuries that sympathetic ophthalmia was observed almost without exception where the injured eye was removed relatively late, i. e., after the sixth week; and if the number of sympathetic ophthalmias is about the same as that which we ordinarily find after injuries or eye diseases which are prone to cause sympathetic ophthalmia, then we would have to conclude: that the marked reduction in the number of sympathetic ophthalmias in war injuries is due to timely enucleation, a fact that would deserve the widest publication.

If the rare occurrence of sympathetic ophthalmia in war injuries, is not due to the early enucleation, but to internal causes, then an explanation of this fact would have to be looked for. There may be a certain predisposition on the part of some individuals; poorly nourished patients and lymphatic children are prone to the disease. Changes in the blood were reported by Ormond and later verified by others.

If internal causes are to be accepted as a reason for the rare occurrence of sympathetic ophthalmia in the war injuries, the physical fitness of the soldier deserves consideration; and whether or not some general condition, overlooked at the time of medical examination, or which developed later in the course of the war, could be responsible in those cases which have acquired sympathetic ophthalmia.

Antonio Alonso. Langrange's and Elliot's Operations in Glaucoma. (III National Medical Congress of Mexico. Puebla, 1918.)

The author gives full credit to Langrange for the priority of the idea of deliberately forming a subconjunctival

fistula for the relief of glaucoma, Holth's method with the punch hole and Elliot's trephine being only varieties of technic. He quotes at large the investigations made on animals' eyes by Rochon-Duvigneaud and Bonnefon, from which it has been proved that the loss of substance in the sclera and also in the cornea, have a great tendency to cicatrization, according to the ordinary laws of physiology.

In glaucomatous eyes, however, the conditions which are necessary for obtaining a good subconjunctival filtration and a permanent reduction of the intraocular tension are not yet known. Lagrange states that only the section in a longitudinal way of one of the borders of the scleral wound, can give constant and permanent results.

Elliot's operation is a good method, easily mastered, which must be applied especially in cases of malignant or hemorrhagic glaucoma, in which the section of the cornea, even a small one, is liable to great dangers for the eye, such as loss of vitreous, lens luxation and profuse or expulsive intraocular hemorrhage. Trephining is also indicated in chronic glaucomas and in some of the subacute and secondary types; but in acute glaucoma the best operation will always be the old von Graefe iridectomy.

According to Alonso, the conjunctival flap, as made by Elliot, is difficult to dissect without perforation. He has used with great advantage a flap made from the sclero-corneal margin backward, similar to that used by Dupuy-Dutemps and Van Lint for cataract extraction. Two lateral sutures are made in order to cover the wound. He recommends also instead of the Elliot's trephine the von Hippel automatic instrument, which is easily applied and without danger.

The paper ends with the report of 15 cases of trephining with good results, in several forms of glaucoma.

URIBE-TRONCOSO.

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H. A. FOX, Manager, 7 West Madison St., Chicago, Ill.

ALLIES IN OPHTHALMOLOGY.

The idea of a world congress of ophthalmology, referred to last month, should not be lost sight of; but meanwhile, individual ophthalmologists who can visit the other side of the Atlantic, should try to attend the national ophthalmic associations of the countries they visit.

In Great Britain the Ophthalmological Society of the United Kingdom will meet in London, May 1st to 3d. The special subject for discussion will be "Visual Requirements for Aviators;" and Col. Wilmer of Washington is expected to take a leading part. The Bowman Lecture will be given by Morax of Paris, and there will be visits to the blind and myopia schools and to the Central London Ophthalmic Hospital.

When the Oxford Congress meets July 10th to 12th, it is to be hoped that the congestion of ocean travel will be less extreme than it still is; and the opportunity for spending vacation weeks in the rural regions and resorts of Great Britain will again be open to

American visitors. It is worth while this year to make a special effort to meet British ophthalmologists on their own ground.

Paris is still almost a closed city to casual visitors, but within the next few months, we may hope that conditions will be returning to near the normal; and in Paris and other continental centers, the ophthalmologist will meet a new respect for all things American, and a cordiality of welcome rarely known before. The desire to get in closer touch with us is expressed in many ways in the letters received by the editors of the Journal.

A collaborator writes to one of the editors: "When shall we have the pleasure to see you in Paris? Clemenceau said the other day: 'We met as friends and will part as brothers.' You really cannot postpone a voyage to Europe." This is not merely personal, it is the invitation of French ophthalmologists toward their American confreres.

A still more detailed and emphatic invitation comes to another of our edi-

tors from London; it is an appeal that should be heard and heeded:

"I am writing to ask you if there is any chance of your being able to attend the Oxford Congress of Ophthalmology, this year. We have kept it in being right through the war, though it meant a sore struggle to do so. Now we want to open out again, and to recall its former triumphs and to excel them. You know our founder kept before him the ideals that this congress should be free from formality, that all should be welcome there, and that the youngest might speak and be sympathetically listened to by all alike. Above all our watchword is Internationalism. We want to see the peoples who stood by us in the fight for the world's freedom, gathered with us in profitable discussion and in friendly social intercourse. I want your help personally, because I admire your work so much, and the same is true of us all, as a council or as a congress. Will you come and will you do something; show us something new; give us a lecture, or a demonstration; do anything! If you really cannot come, will you try to interest some of your Chicago members to both come, and to do something. They will be sincerely welcomed. I hope you will both come and get others to do so.

"If there is one ideal dearer to me than any other, it is to cement the bonds that unite the Anglo-Saxon peoples, and all who speak the tongue of freedom. To me the English-speaking peoples should be one in sympathy, as they have shown themselves one in all that is best, in courage, in care for the weak, and in sacrifice of all they count dearest for the call of honour and right. Oxford is one of the opportunities of meeting and getting to know each other. Will you put your persuasive pen and your yet more persuasive mind to work to help on our meeting?

"The best of everything to you and to all my many friends under the Stars and Stripes."

The force of such an appeal to both the heart and intelligence must be felt by every American ophthalmologist.

E. J.

TRAINING FOR OPHTHALMIC PRACTICE.

Interest in this subject should not be confined to a few teachers of ophthalmology, and the relatively small proportion of medical graduates who are seeking such training as preparation for special practice. It is important to the whole medical profession and the whole community. The imperfect development of courses in ophthalmology, and their neglect by those who should avail themselves of them, impair the service that they should be fitted to render to physicians and their patients. There are especially important reasons why every one practicing ophthalmology should give active attention and thought to this matter.

When Germany decided that war should be used to achieve world domination, there were in attendance at her medical schools and clinics 298 students from America, of whom a relatively large proportion were studying ophthalmology. For five years this stream of students has been wholly interrupted. For many more years it will be impossible for German universities to give even such instruction as they have given in the past.

Anarchy and arson, war debts, the loss of old teachers, and the interrupted development of new ones, combine to bring about this change; while on the other side the feeling of disgust and contempt for the professors who prostituted their position in the world of science to serve imperial autocracy and militarism, are strongly operative.

Ophthalmology must be taught elsewhere than in the clinics of Germany, and it can best be done in the medical institutions of America. In bringing about a better appreciation of the needs for such teaching, and what such teaching should be, American ophthalmologists must do some active work.

The first thing to do in this direction is to get a general conception of what training for ophthalmic practice ought to be, and how impossible it has been to get the right kind of training in the past. In the last few months we have had numerous expressions with

regard to it. In this number are included two papers with regard to it, and three letters bearing upon it will be found in this issue under the head of correspondence.

The first letter is published without giving its author's name because he is out of the country, and because its significance cannot be appreciated without an explanation of how carefully this well known ophthalmologist had tried to prepare himself for his work. He was a college graduate before he studied medicine. He took a three years' course in medicine when the mass of students were graduating after two five months' courses of lectures. Then he served full terms as interne in one of the best known general hospitals of America, and in one of the largest eye hospitals. After that he studied many months in the great eye clinics of Europe.

Returning to this country, he quickly became the leading ophthalmologist in one of our large Eastern cities. His well used opportunities for special study were greater than those of most of us, yet they were so far below what we have a right to expect in the way of systematic training that he says: "Our generation picked up in the most casual manner what little we got to know."

The other letters were selected from among those which have come to the editor in the last few months, as showing independent views on this subject. One of them estimates the deficiencies of opportunities for ophthalmic training now offered in this country, even when selected with wise discrimination, and used with intelligence and earnestness. The other expresses a hope that has arisen among American ophthalmologists, that something will soon be done to establish schools for preparation for ophthalmic practice. A further account of the army school referred to in the third letter will be published in an early number of this Journal.

When we have gotten a conception of what training for ophthalmic practice ought to be, in this age of educa-

tional institutions, laboratories and hospitals, we ought to exert our influence as individuals and thru our organizations to see that the right sort of training is offered and that the inertia of tradition is overcome to utilize it.

In at least a dozen strong universities that have medical departments there should be established courses, chiefly laboratory, on physical and physiologic optics, and on the anatomy, histology, physiology, and pathology of the eye, and on the anatomy and physiology of the visual tracts and centers, and the principles of ocular diagnosis. These are not the only things that are needed in the training for ophthalmic practice; but they are the things that have been most neglected, and can be best taught with a good university equipment.

Every clinical school for teaching ophthalmology should call attention in its announcements to the importance of such courses as preliminary to clinical study. When the mass of its students come with such preparation for its clinical work, it will be able to give far more efficient and satisfactory courses of clinical instruction. The stronger, more ambitious postgraduate medical schools, supplied with fair laboratories, might well undertake to give such fundamental courses in ophthalmology within their own walls.

Every prospective student of ophthalmology as a branch for special practice, will seek the advice of some ophthalmologist as to the best course of study to pursue. Every ophthalmologist, conscious of the difficulties with which he has had to contend, should be ready to advise the student as to how and where he can spend his time, effort and money, to the best advantage to himself and the public he expects to serve. Every graduate in medicine can exert some influence with his Alma Mater or the university of his city or state, to bring about a practical recognition of the need of reasonable training for ophthalmic practice. All influence possible will be needed, to hasten such a desirable advance in the

method of making ophthalmologists, at this time when the students of the world are seeking new centers of medical teaching.

E. J.

DONDERS AND GRAEFE.

All we can learn of these great men must be of interest to ophthalmologists; and we are particularly fortunate in having the letters (published p. 277) which passed between them preserved and so adequately translated into English. Seldom have letters of such deep autobiographic interest been published.

It is interesting to note that Donders, Jaeger and Graefe met when they were all studying ophthalmology in London; and how the enthusiasm of the youngest, Graefe, flamed up in friendship for his older, more self-contained and balanced comrade. His enthusiasm and his appreciation of achievements, which, if greater, were less spectacular than his own, and attracting far less attention at the time, marks the true greatness of Graefe.

In these letters, which reveal the deep desires and hunger for comradeship on the part of the ophthalmologist, who, more than any other one, made Germany the great center for ophthalmic training, we can catch a glimpse of those springs of human action that usually remain deeply hidden in the individual life.

It may be regretted that the corresponding letters of Donders have been destroyed with something of that disregard for all that is of other than German origin that has been creeping like a palsy on the scientific life of Germany since 1870 when Graefe died. But we may well doubt if Donders' letters were so self-revealing, altho they might have contained much of scientific interest. It is unfortunate that of American ophthalmologists who went abroad to study in the last generation, more did not go to Utrecht rather than Berlin. We must suspect that the trend of Graefe's genius, toward striking operative achievements, better caught and held the interest of the

"practical" American students. It is interesting to find that he had so just an appreciation of the value of operative achievements as compared with the more purely scientific far-reaching labors of his colleagues.

E. J.

BOOK NOTICES.

COMUNICACIONES DEL HOSPITAL OFTALMOLOGICO. Reports from the Ophthalmic Hospital of Buenos Aires. Vo. I, No. 1, December, 1918. Royal 8vo., pp. 160.

We have before taken occasion to mark the development and activity of a center of ophthalmology in Buenos Aires. These are again forced on our attention by these hospital reports. Making their initial appearance, they are found to bear well a comparison with the first parts of the Reports of the Royal London Ophthalmic Hospital, London, or Donders' Hospital Reports, from Utrecht. They are not surpassed in general scientific value by any Ophthalmic Hospital Reports that have appeared in the United States.

The scope of the work may be judged by the subjects of the eight reports by as many authors, which comprise the bulk of the work. These are: Sanguineous Infiltration of the Cornea, Acute Dacryoadenitis, Tuberculous Periphlebitis of the Retina, Ophthalmoplegia, Nodding and Rotary Spasm, Megalocornea, Pontine Cerebellar Tumor, and Arteriovenous Aneurism of the Internal Carotid. In addition there is a Review Department of 20 pages containing abstracts of 13 articles relating to ophthalmology taken, not from European sources, but from the medical publications of Argentina.

These reports are well illustrated. The article of 70 pages on Ophthalmoplegia contains 56 illustrations in the text, mostly reproductions of photographs of cases. The paper on Retinal Periphlebitis has a colored plate representing the condition. Every article except the first one has one or more illustrations; and most of them are excellent. We note the absence of an

index, but this may come in a later part.

The appearance of this new series of hospital reports is a subject for congratulation, not only to its sponsors and contributors, but also to the ophthalmologists of the world. If one wishes to make the acquaintance of the Spanish language, and the literature of ophthalmology published in it, we know of no collection of papers of higher scientific value and literary excellence thru which he may enter upon such a study.

E. J.

CORRESPONDENCE.

Training in Ophthalmology

To the Editor:

I cannot resist the temptation to write you a line to say how much I have been impressed with your thoughtful article on Defects of Education for Ophthalmic Practice in the July number of the JOURNAL, which I received recently.

As you say, "Those of us who are engaged in ophthalmic practice are more or less conscious of our deficiencies," and as one looks back it is easy to see how great a proportion of these deficiencies could have been obviated by a little systematic training. Our generation picked up in the most casual manner what little we got to know. I spent a year in the Wills Eye Hospital, but it took me more than a month learning to see the fundus, an accomplishment which I have many times enabled men to acquire in half an hour. The Wills Hospital staff were all capable men, and I found them kind, but they were too busy to give special instruction, and it was not their business.

Probably the remedies you suggest are about the best that we can hope for for some time; but I think that in time special schools of ophthalmology will be established in connection with universities in a few (perhaps the fewer the better), of the large cities. These schools will give a thorough course, beginning with mathematics, optics, ocular anatomy, etc. The di-

ploma given by these institutions will be so desirable that they will attract more and more men. Their examinations will be severe as the instruction will be thorough. Such schools in the nature of things cannot be self-supporting, but the example of Carnegie and Rockefeller will doubtless be followed by others, so that endowments may be expected. * * *

To the Editor:

After reading, again and again, your paper in the AMERICAN JOURNAL OF OPHTHALMOLOGY, (v. i, p. 482), I write you, telling how I appreciate your opinions and expression on this subject.

In the fall of 1915, I gave up my general practice, and took up my studies of the eye as well as the ear, nose, and throat. I wanted the best school, so I thought my selection was a wise one when I went to New York and entered the New York Post Graduate School. I was surprised at my capacity to apply myself. I worked harder than I did in my undergraduate school, for over eight months. Feeling that I was not getting as good instruction as I wished for, I worked during my spare time at the Eye and Ear Infirmary. I spared neither money, nor effort. But when I left New York I felt that I had failed to attain what I sought and desired.

So I wondered and thought, and tried again and again to examine myself. While I realize that my deficiencies are many, I can't help but conclude that the teachings, or rather the methods of teaching in all the Post Graduate schools, especially in the special, are very sadly deficient. I feel too modest and humble to undertake a crusade on the subject of post-graduate schools. Altho I approached several postgraduates on the subject and they agreed with me, yet I do not feel of enough force to be able to carry any reform thru. Reading your paper revived my spirits, and I feel that I must be right, as others are thinking the same.

I am writing to express my appreciation and approval of your opinion on

the subject, and expressing my hopes that you will continue vigorous action toward a reform. I hope that the American Medical Association will some day take this matter up; and institute some regulations in the matter of postgraduate schools and thereby protect the many physicians who honestly and earnestly are seeking to improve themselves for the good of the profession and humanity.

As for myself; I shall not get discouraged. I shall plug along, read, observe, and work diligently until some day I hope to attain the position of the efficient; and hope that if I ever rise enough to be heard, I shall enter into the effort to cause a reform, with all my might and with all my influence.

Very truly yours,

M. H. HELDMAN.

Great Falls, Montana.

To the Editor:

I have read with intense interest Colonel de Schweinitz's account of the

Army School of Ophthalmology. Such a school located in one (or more) of the large cities (Baltimore, Philadelphia, Chicago, Denver), is certainly needed.

A majority of the four thousand American oculists would enjoy and profit by such courses at times. At the same time, if properly conducted, with well paid teachers, the school would furnish a standard of efficiency for those wishing to study and practice ophthalmology as a specialty. The difficulties were great (and have not been lessened, I believe), in getting instruction of the kind detailed in Colonel de Schweinitz's article in your issue, December, 1918. Well trained teachers, if well paid, might easily be attracted to such service.

I earnestly wish you could propose such a permanent School of Ophthalmology.

Yours truly,

EDWARD F. PARKER.

Charleston, S. C.

NEWS ITEMS

Personals and items of interest should be sent to Dr. Melville Black, 424 Metropolitan Building, Denver, Colorado. They should be sent in by the 25th of the month. The following gentlemen have consented to supply the news from their respective sections: Dr. Edmond E. Blaauw, Buffalo; Dr. H. Alexander Brown, San Francisco; Dr. V. A. Chapman, Milwaukee; Dr. Robert Fagin, Memphis; Dr. M. Feingold, New Orleans; Dr. Wm. F. Hardy, St. Louis; Dr. Geo. F. Keiper, LaFayette, Indiana; Dr. Geo. H. Kress, Los Angeles; Dr. W. H. Lowell, Boston; Dr. Pacheco Luna, Guatemala City, Central America; Dr. Wm. R. Murray, Minneapolis; Dr. G. Oram Ring, Philadelphia; Dr. Chas. P. Small, Chicago; Dr. John E. Virnden, New York City; Dr. John O. McReynolds, Dallas, Texas; Dr. Edward F. Parker, Charleston, S. C. Volunteers are needed in other localities.

DEATHS.

Dr. John B. Hazel, Hoopeston, Illinois, aged 69, died at his home, January 20th, from heart disease.

Dr. John G. Hersh, East Greenville, Pa., aged 66, died at his home, February 2nd, from bronchial pneumonia.

PERSONALS.

Dr. J. W. Jervey has just announced the opening of a modern Eye, Ear and Throat Hospital in Greenville, South Carolina.

Dr. Luther Peter of Philadelphia has been elected Professor of Ophthalmology in the Post Graduate School of the University of Pennsylvania.

Dr. Ervin Wright, of Huntington, Indiana, has gone to Rolla, Missouri, to continue eye, ear, nose and throat practice.

Dr. William Campbell Posey, after twenty-five years of valued service as Surgeon to Wills Eye Hospital, Philadelphia, has resigned from the institution and has been succeeded by Dr. T. E. Conrad.

MILITARY NOTES.

Dr. W. E. Kershner, Major, M. R. C., has resumed practice at Bath, Maine.

Dr. J. J. Smith has returned to practice in San Francisco after service in the United States Army.

Capt. A. B. Middleton has been released from the service, and has resumed his practice at Pontiac, Illinois.

Dr. H. M. Krebs of Huntington, Indiana, has been promoted to Lieut.-Col. and has resumed his practice in Huntington.

Capt. W. A. Sedwick of Denver has been transferred from Camp Grant to U. S. General Hospital, Biltmore, North Carolina.

Capt. Alfred Cowan of Philadelphia, Instructor in Ophthalmology at Camp Oglethorpe, after a year of service has resumed private practice at 2018 Chestnut street.

B. F. Baerr, Jr., of Philadelphia, who went abroad as Ophthalmic Surgeon with Base Hospital Unit of the University of Pennsylvania, has been relieved from service and has resumed private practice at 2037 Chestnut street.

Lieut. Wm. M. Bane, who was with Base Hospital No. 29, A. E. F., London, has returned to Denver to resume his association with his father, Dr. Wm. C. Bane.

Capt. Wm. C. Finnoff has returned to his home in Denver to resume practice. He will be associated with Dr. Edward Jackson. Dr. Finnoff had a most valuable experience with Base Hospital Number 29 as ophthalmologist.

Major George W. Jean, M. C., U. S. Army, returned from France early in February. While overseas he was chief consultant on the eye for the five Base Hospitals located at Rimacourt, Haute-Marne. After two months in California he will resume his practice in New York City.

Major Burton Chance, who was assigned to the U. S. Hospital No. 11, Cape May, New Jersey, May, 1918, in charge of the Division of Ophthalmology, was released from service December 6, 1918, and has been appointed Lieutenant-Colonel, Medical Corps, U. S. Reserve.

Captain Charles M. Stiles, of Philadelphia, began his Army service by a brief period of training at Camps Greenleaf and McClellan, and on October 16, 1917, was placed in charge of the Division of Ophthalmology at Camp Wadsworth, South Carolina, where he remained for fourteen months. Captain Stiles has recently been released from service, and has resumed his practice.

Colonel Gilbert E. Seaman, after returning from overseas duty, recently gave Doctors Howard Ford Hansell, and G. Oram Ring of Philadelphia the pleasure of a brief visit. Colonel Seaman served in the Philippines from 1898 to 1900. He entered the U. S. Service in connection with the recent war as Lieutenant Colonel, and was made Chief Surgeon of the 32nd Division of the Sixth Army Corps. He will shortly resume his Eye, Ear, Nose and Throat practice in Milwaukee.

COMING MEETINGS.

Section on Ophthalmology, American Medical Association, Atlantic City, New Jersey, June 9-13.

American Ophthalmological Society, Atlantic City, New Jersey, June 13-17.

Pacific Coast Oto-Ophthalmic Society, San Francisco, California, August 4-6.

American Academy of Ophthalmology and Oto-Laryngology, September 2-3.

Ophthalmological Society of the United Kingdom, London, May 1-3.

Société Française d'Ophthalmologie, Paris, May 5th.

Oxford Ophthalmological Congress, Oxford, England, July 10-12.

MISCELLANEOUS.

A Seventh Trachoma Hospital established by the U. S. Government has been opened in La Moure, North Dakota, under the charge of Dr. Clarence E. Downs.

Soldiers blinded in war, who are receiving vocational training at United States Hospital Number 7, Evergreen Junior, have received a gift of nearly \$3,000 from the Baltimore committee of the Woman's Homeopathic Base Hospital Unit.

A mass meeting in honor of Sir Arthur Pearson, Mr. Douglas McMurtrie, Lieut.-Col. James Bordley, was held January 28th at Orchestra Hall, Chicago, under the auspices of the New York Red Cross Institute for Crippled and Disabled Men and the Service League for the Handicapped, of Chicago.

The National Committee for the Prevention of Blindness is asking contributions from public spirited persons toward the sum of \$20,000 to further their great work in the prevention of blindness. Checks should be made payable to Mr. George Blagden, 130 East Twenty-second street, New York.

The Chicago Lighthouse is the name of a new institution conducted by the Improvement Association for Blind People, to teach the blind useful occupations so that they may become self-supporting. It is located at 3323 West Twenty-second street, Chicago. Miss Phyllis Bayley is the director, Mrs. Harry J. Ilett, president, and Sir Arthur Pearson, honorary president. The Board of Advisers is composed of eight of Chicago's prominent men.

Four new books from the pen of Sir J. W. Barrett, of the University of Melbourne, are announced by H. K. Lewis and Co., of London. Now ready, "The Australian Army Medical Corps in Egypt," and "The Twin Ideals, An Educated Commonwealth," (reviewed in this Journal, v. 1, p. 871); and in press "A Vision of the Possible, What the R. A. M. C. Might Become," and "The War Work of the Y. M. C. A. in Egypt."

Harry Gulf, of Gallatin County, Wis., has returned to his home with a war record that makes one feel that the war should be resumed. In the Argonne, the last battle of the war he was wounded and taken prisoner by the Germans. The Hun monsters who captured him, wounded and completely at their mercy, actually punched out his eyes, forever destroying his sight. At this time the young man's left foot was torn off by a shot, and numerous other wounds inflicted.

According to the *Shelbyville Republican* people in that part of Indiana have been learning by costly experience the ways of the traveling oculist, or the swindler who calls himself an oculist. Two such adventurers by pretending to find a growth on the eye and doing a fake operation to remove it, were able to effect the actual removal of two hundred and seventy-five dollars from one patient, and one hundred and sixty from another.

The first number of the "Comunicaciones del Hospital Oftalmologico" was issued in December, 1918, from Buenos Aires, A. R. Its object is to collect and publish the papers of the staff of the Hospital Oftalmologico, which has fourteen oculists and five physicians for consultation in neurology, medicine, etc., and two internes. This hospital examined and treated 15,000 new patients last year. There are eight papers and a review of the Argentine literature in this issue.

The American Board of Ophthalmic Examination will hold its next examinations at the Wills Eye Hospital, Philadelphia, June 6 and 7, 1919. This is the fifth examination to be conducted by the Board, which is composed of representatives of the American Ophthalmological Society, the Section of Ophthalmology of the A. M. A., and the Academy of Ophthalmology and Oto-Laryngology. The many war activities have interfered with the work of the board for the past year, but from now on it is expected that great activity will prevail. Complete information can be had by writing Dr. Wm. H. Wilder, 122 South Michigan avenue, Chicago.

The Council of British Ophthalmologists appointed a committee consisting of eminent ophthalmologists and physicists to determine standards of illumination for Snellen's test types for distant vision. The committee reports: 1. There is a rapid rise in acuity as the illumination is increased from zero up to about two "foot candles." 2. Above three foot candles there is scarcely any rise in acuity. It is possible to lay down precise and simple rules. Two ordinary 20 Watt tungsten lamps, with straight filaments are fixed vertically fifteen inches in front of the plane of the test card, one on each side at a horizontal distance of twelve inches from the vertical normal to and bisecting the card. One lamp is placed higher than the other, one being opposite the junction of the upper and middle thirds of the card, the other opposite the junction of the middle and lower thirds. Opaque, non-reflecting screens are fitted so as to prevent direct light from reaching the candidate's eye.

The days of the blind beggar are numbered. The familiar figure with his tin cup, his dark glasses and his sign, "Please help the blind," was largely the creature of circumstance. There was nothing else for him to do. Today a blind man finds it possible to be reeducated and to continue a useful member of society. Sir Arthur Pearson, a millionaire publisher, of London, totally blind, is in this country, telling us of the wonders that have been accomplished for blinded soldiers and sailors at St. Dunstan's Hospital, London. It was the wonderful progress made by the blinded soldiers of England that prompted that nation to make such enormous strides in the reeducation of its blind, and it is to be hoped that the remarkable capacity of our own blinded heroes, just returned from the battlefield, will direct the thought of our nation to our own civilian blind. It is a matter for state action and is a field that the wealthy can work in. What could be more satisfying in one's declining years than to superintend the erection of an institution for the reeducation of the blind and then endow it with funds to perpetuate its existence, that it might act as a living monument of usefulness to the donor's name forever?

As stated in the circular memoranda for Editors of Medical Publications issued by the Surgeon General's Office on March 27th and May 22d, 1918, it is required by paragraph 423, Manual of the Medical Department, that all medical manuscripts by medical officers, U. S. Army, intended for publication shall be first submitted to the Surgeon General's Office, Washington, D. C., for approval. This regulation, which has been very courteously complied with, to date, is still in force as far as medical officers on active duty are concerned. In the case of medical officers recently retired from active duty, it is requested, as a courtesy to the Surgeon General and in aid of assembling material for the Medical History of the War, that all medical manuscripts based upon military or official records or upon military experience during the War, be submitted as heretofore, to the Secretary, Board of Publications, Surgeon General's Office, Washington, D. C., for record and approval, and that such MSS. be accompanied by a carbon copy. Upon approval, the original copy will be forwarded to the journal designated, for publication, and the carbon will be filed in the records of the Medical History of the War.

For the Surgeon General:

(Signed) C. R. DARNALL,
Colonel, Medical Corps, U. S. A.,
Executive Officer.

OPHTHALMIC LITERATURE

These lists contain the titles of all papers bearing on Ophthalmology received within the preceeding month. These titles are all in English, some of them modified to indicate more clearly their subjects. These subjects are grouped under appropriate heads, the succession of groups being the same from month to month. In the group the papers are arranged alphabetically usually by the name of the author in heavy-face type. After the subject of the paper (Ill.) indicates the number of illustrations. (Pl.) the number of plates, and (Col. pl.) colored plates illustrating the article. (Abst.) shows that it is an abstract of the original article. (Bibl.) tells that the paper is accompanied by an important bibliography. (Dis.) means that a discussion of the subject is published with it. Under Repeated Titles are indicated additional publication of papers already noticed. To secure the earliest possible notice writers may send copies of their papers, or reprints, to 318 Majestic Bldg., Denver, Colorado.

DIAGNOSIS.

- Bader, A.** Differential Tonometry. Münch. med. Woch., 1917, p. 1116.
Dixey, W. A. Illumination of Snellen's Test Types. Brit. Jour. Ophth., v. 3, p. 95.
Elschnig, A. Study of Magnified Reflex Images of Eye. Klin. M. f. Augenh., v. 56, pp. 23-26.
Gonzalez, J. Examination of Eye. Med. Ibera, v. 5, p. 289.
Hagen, S. Photography of Background of Eye. Klin. M. f. Augenh., v. 59, pp. 17-18.
Heine, L. Ophthalmoscopy in White and Colored Light. (2 col. pl.) Graefe's Arch. f. Ophth., v. 97, pp. 271-274.
Isakowitz. Stereoscopy of Background of Eye. Münch. med. Woch., 1918, p. 682.
Koeppe, L. Microscopy of Background of Eye. Graefe's Arch. f. Ophth., v. 97, pp. 346-381.
Schwarz, O. Perimeter, Exophthalmometer, and Binocular Loup. Münch. med. Woch., 1918, p. 1414.
Sichel, A. W. Test Types for Detection of Malingering in Army. Brit. Jour. Ophth., v. 3, pp. 117-120.
Stumpf, P. Pocket Lamp with Ophthalmoscope. Münch. med. Woch., 1917, p. 271.
Sym, W. G. Familiarity with the Ophthalmoscope. Lancet, Feb. 8, 1919, p. 232.
Trendelenburg, W. Instrument for Measuring Distance Between Pupils. (1 ill.) Klin. M. f. Augenh., v. 61, pp. 564-566.
Wallace, W. Epidiascope Showing Fundus. Roy. Soc. Med. Sec. on Ophth., Feb. 5th, 1919. Lancet, Feb. 22nd, p. 300.
Wertheim-Salomonson, J. K. A. Photography of Background of Eye. (Dis.) Amer. Jour. Ophth., v. 2, p. 147.
Wiedersheim, O. Improvised Adaptometer for Field Work. (4 ill.) Klin. M. f. Augenh., v. 58, pp. 507-510.
 Repeated Titles. **Roelofs.** (v. 1, p. 811.) Amer. Jour. Ophth., v. 2, p. 147.

THERAPEUTICS.

- Binder, K.** Physostol. (Bibl.) Klin. M. f. Augenh., v. 56, pp. 559-562.
Gradle, H. S. Clinical Experience with Opiachin. Klin. M. f. Augenh., v. 55, pp. 362-365.
Gros, H., and Fromaget, H. Analgesic Action of Weak Faradic Current in Ophthalmology. Clin. Opht., v. 23, pp. 22-38.

- Scalinci, N.** Ocular Radiotherapy. Riforma Med., v. 35, p. 10, and p. 92.
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